[H.A.S.C. No. 99-13]

HEARINGS

ON

H.R. 1873

[H.R. 1872]

DEPARTMENT OF ENERGY NATIONAL SECURITY PROGRAMS AUTHORIZATION ACT FOR FISCAL YEARS 1986 AND 1987

BEFORE THE

PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
NINETY-NINTH CONGRESS
FIRST SESSION

HEARINGS HELD FEBRUARY 20, 21, and 22, 1985

U.S. GOVERNMENT PRINTING OFFICE
54-103 O WASHINGTON : 1985

H201-4

PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

SAMUEL S. STRATTON, New York, *Chairman*

BEVERLY B. BYRON, Maryland
NICHOLAS MAVROULES, Massachusetts
IKE SKELTON, Missouri
MARVIN LEATH, Texas
ROY DYSON, Maryland
MARILYN LLOYD, Tennessee
RICHARD RAY, Georgia
JOHN M. SPRATT, Jr., South Carolina
ALBERT G. BUSTAMANTE, Texas

MARJORIE S. HOLT, Maryland
ROBERT E. BADHAM, California
JIM COURTER, New Jersey
KEN KRAMER, Colorado
ROBERT W. DAVIS, Michigan
LARRY J. HOPKINS, Kentucky
DUNCAN L. HUNTER, California

ADAM J. KLEIN, *Counsel*
JOHN E. MANSFIELD, *Professional Staff Member*

99TH CONGRESS
1ST SESSION

H. R. 1873

To authorize appropriations for the Department of Energy for national security programs for fiscal year 1986 and fiscal year 1987, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

APRIL 2, 1985

Mr. STRATTON (for himself and Mrs. HOLT) (by request) introduced the following bill; which was referred to the Committee on Armed Services

---

A BILL

To authorize appropriations for the Department of Energy for national security programs for fiscal year 1986 and fiscal year 1987, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Security Programs Authorization Act for Fiscal Years 1986 and 1987".

TITLE I—NATIONAL SECURITY PROGRAMS

OPERATING EXPENSES

SEC. 101. Funds are authorized to be appropriated to the Department of Energy for fiscal year 1986 for operating expenses incurred in carrying out national security programs (including scientific research and development in support of the Armed Forces, strategic and critical materials necessary for the common defense, and military applications of nuclear energy and related management and support activities) as follows:

(1) For weapons activities, $3,505,400,000.

(2) For materials production, $1,616,300,000.

(3) For defense waste and byproducts management, $405,122,000.

(4) For verification and control technology, $83,475,000.

(5) For nuclear safeguards and security, $54,325,000.

(6) For security investigations, $33,400,000.

(7) For naval reactors development, $489,000,000.

PLANT AND CAPITAL EQUIPMENT

SEC. 102. Funds are authorized to be appropriated to the Department of Energy for fiscal year 1986 for plant and capital equipment (including planning, construction, acquisition, and modification of facilities, land acquisition related thereto, and acquisition and fabrication of capital equipment not related to construction) necessary for national security programs as follows:

(1) For weapons activities:

Project 86-D-101, general plant projects, various locations, $29,900,000.

Project 86-D-121, general plant projects, various locations, $33,700,000.

Project 86-D-103, decontamination and waste treatment facility, Lawrence Livermore National Laboratory, Livermore, California, $1,000,000.

Project 86-D-104, strategic defenses facility, Sandia National Laboratories, Albuquerque, New Mexico, $8,000,000.

Project 86-D-122, structural upgrade of existing plutonium facilities, Rocky Flats Plant, Golden, Colorado, $3,000,000.

Project 86-D-123, environmental hazards elimination, various locations, $8,700,000.

Project 86-D-124, safeguards and site security upgrading, phase II, Mound Plant, Miamisburg, Ohio, $3,000,000.

Project 86-D-125, safeguards and site security upgrade, phase II, Pantex Plant, Amarillo, Texas, $1,500,000.

Project 86-D-130, Tritium loading facility replacement, Savannah River Plant, Aiken, South Carolina, $5,000,000.

Project 85-D-102, nuclear weapons research, development, and testing facilities revitalization, phase I, various locations, $81,600,000, for a total project authorization of $117,000,000.

Project 85-D-103, safeguards and security enhancements, Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore, California, $27,900,000, for a total project authorization of $32,600,000.

Project 85-D-105, combined device assembly facility, Nevada Test Site, Nevada, $45,400,000, for a total project authorization of $53,000,000.

Project 85-D-106, hardened engineering test building, Lawrence Livermore National Laboratory, Livermore, California, $1,900,000, for a total project authorization of $2,700,000.

Project 85-D-112, enriched uranium recovery improvements, Y-12 Plant, Oak Ridge, Tennessee, $15,300,000, for a total project authorization of $19,800,000.

Project 85-D-113, powerplant and steam distribution system, Pantex Plant, Amarillo, Texas, $18,500,000, for a total project authorization of $23,000,000.

Project 85-D-115, renovate plutonium building utility systems, Rocky Flats Plant, Golden, Colorado, $17,700,000, for a total project authorization of $20,600,000.

Project 85-D-121, air and water pollution control facilities, Y-12 Plant, Oak Ridge, Tennessee, $14,000,000, for a total project authorization of $19,000,000.

Project 85-D-123, safeguards and site security upgrade, phase I, Pantex Plant, Amarillo, Texas, $4,000,000, for a total project authorization of $5,000,000.

Project 85-D-124, safeguards and site security upgrade, Rocky Flats Plant, Golden, Colorado, $2,400,000, for a total project authorization of $3,400,000.

Project 85-D-125, tactical bomb production facilities, various locations, $11,000,000, for a total project authorization of $21,000,000.

Project 84-D-102, radiation-hardened integrated circuit laboratory, Sandia National Laboratories, Albuquerque, New Mexico, $15,500,000, for a total project authorization of $37,500,000.

Project 84-D-104, nuclear materials storage facility, Los Alamos National Laboratory, Los Alamos, New Mexico, $12,100,000, for a total project authorization of $19,300,000.

Project 84-D-107, nuclear testing facilities revitalization, various locations, $30,540,000, for a total project authorization of $65,940,000.

Project 84-D-112, Trident II warhead production facilities, various locations, $60,700,000, for a total project authorization of $140,700,000.

Project 84-D-113, antisubmarine warfare/standoff weapon warhead production facilities, various locations, $16,000,000.

Project 84-D-115, electrical system expansion, Pantex Plant, Amarillo, Texas, $3,300,000, for a total project authorization of $14,800,000.

Project 84-D-117, inert assembly and test facility, Pantex Plant, Amarillo, Texas, $400,000, for a total project authorization of $13,600,000.

Project 84-D-118, high-explosive subassembly facility, Pantex Plant, Amarillo, Texas, $40,000,000, for a total project authorization of $47,000,000.

Project 84-D-120, explosive component test facility, Mound Plant, Miamisburg, Ohio, $2,300,000, for a total project authorization of $22,300,000.

Project 84-D-211, safeguards and site security upgrading, Y-12 Plant, Oak Ridge, Tennessee, $7,500,000, for a total project authorization of $23,000,000.

Project 84-D-212, safeguards and site security upgrade, Pinellas Plant, Florida, $3,800,000, for a total project authorization of $7,500,000.

Project 83-D-199, buffer land acquisition, Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore, California, $17,000,000, for a total project authorization of $34,000,000.

Project 82-D-107, utilities and equipment restoration, replacement, and upgrade, phase III, various locations, $195,500,000, for a total project authorization of $765,900,000.

Project 82-D-111, interactive graphics systems, various locations, $6,000,000, for a total project authorization of $26,000,000.

Project 82-D-144, simulation technology laboratory, Sandia National Laboratories, Albuquerque, New Mexico, $10,300,000, for a total project authorization of $34,000,000.

Project 79-7-0, universal pilot plant, Pantex Plant, Amarillo, Texas, $4,500,000, for a total project authorization of $20,400,000.

(2) For materials production:

Project 86-D-146, general plant projects, various locations, $34,800,000.

Project 86-D-149, productivity retention program, phase I, various locations, $27,200,000.

Project 86-D-150, in-core neutron monitoring system, N reactor, Richland, Washington, $5,460,000.

Project 86-D-151, PUREX electrical system upgrade, Richland, Washington, $3,500,000.

Project 86-D-152, reactor electrical distribution system, Savannah River, South Carolina, $4,000,000.

Project 86-D-153, additional line III furnace, Savannah River, South Carolina, $2,000,000.

Project 86-D-154, effluent treatment facility, Savannah River, South Carolina, $2,500,000.

Project 86-D-156, plantwide safeguards systems, Savannah River, South Carolina, $3,000,000.

Project 86-D-157, hydrofluorination system—FB-line, Savannah River, South Carolina, $2,200,000.

Project 85-D-137, vault safety special nuclear material inventory system, Richland, Washington, $1,900,000, for a total project authorization of $4,400,000.

Project 85-D-139, fuel processing restoration, Idaho Fuels Processing Facility, Idaho National Engineering Laboratory, Idaho, $15,000,000, for a total project authorization of $25,000,000.

Project 85-D-140, productivity and radiological improvements, Feed Materials Production Center, Fernald, Ohio, $12,000,000, for a total project authorization of $18,000,000.

Project 85-D-145, fuel production facility, Savannah River, South Carolina, $16,000,000, for a total project authorization of $25,800,000.

Project 84-D-135, process facility modifications, Richland, Washington, $15,000,000, for a total project authorization of $32,500,000.

Project 84-D-136, enriched uranium conversion facility modifications, Y-12 Plant, Oak Ridge, Tennessee, $7,200,000, for a total project authorization of $19,600,000.

Project 83-D-148, non-radioactive hazardous waste management, Savannah River, South

Carolina, $3,100,000, for a total project authorization of $22,100,000.

Project 82-D-124, restoration of production capabilities, phases II, III, IV, and V, various locations, $48,900,000, for a total project authorization of $349,534,000.

Project 82-D-201, special plutonium recovery facilities, JB-Line, Savannah River, South Carolina, $4,400,000, for a total project authorization of $83,800,000.

(3) For defense waste and byproducts management:

Project 86-D-171, general plant projects, interim waste operations and long-term waste management technology, various locations, $26,451,000.

Project 86-D-172, B plant F filter, Richland, Washington, $1,000,000.

Project 86-D-173, central waste disposal facility, Oak Ridge, Tennessee, $1,000,000.

Project 86-D-174, low-level waste processing and shipping system, Feed Materials Production Center, Fernald, Ohio, $2,500,000.

Project 86-D-175, Idaho National Engineering Laboratory security upgrade, Idaho National Engineering Laboratory (INEL), Idaho, $2,000,000.

Project 85-D-157, seventh calcined solids storage facility, Idaho Chemical Processing Plant, Idaho National Engineering Laboratory, Idaho, $14,500,000, for a total project authorization of $21,500,000.

Project 85-D-158, central warehouse upgrade, Richland, Washington, $5,000,000, for a total project authorization of $5,700,000.

Project 85-D-159, new waste transfer facilities, H-Area, Savannah River, South Carolina, $9,000,000, for a total project authorization of $20,000,000.

Project 85-D-160, test reactor area security system upgrade, Idaho National Engineering Laboratory (INEL), Idaho, $2,250,000, for a total project authorization of $4,250,000.

Project 81-T-105, defense waste processing facility, Savannah River, South Carolina, $205,000,000, for a total project authorization of $637,500,000.

(4) For verification and control technology:

Project 85-D-171, space science laboratory, Los Alamos, New Mexico, $4,500,000, for a total project authorization of $5,500,000.

(5) Nuclear safeguards and security:

Project 86-D-186, nuclear safeguards technology laboratory, Los Alamos National Laboratory, Los Alamos, New Mexico, $1,000,000.

(6) For naval reactors development:

Project 86-N-101, general plant projects, various locations, $7,500,000.

Project 86-N-104, reactor modifications, advance test reactor, Idaho National Engneering Laboratory, $4,500,000.

Project 82-N-111, materials facility, Savannah River, South Carolina, $11,000,000, for a total project authorization of $176,000,000.

Project 81-T-112, modifications and additions to prototype facilities, various locations, $27,000,000, for a total project authorization of $137,000,000.

(7) For capital equipment not related to construction—

(A) for weapons activities, $277,750,000;

(B) for materials production, $123,440,000;

(C) for defense waste and byproducts management, $38,997,000;

(D) for verification and control technology, $5,600,000;

(E) for nuclear safeguards and security, $4,600,000; and

(F) for naval reactors development, $30,000,000.

TITLE II—GENERAL PROVISIONS

REPROGRAMMING

SEC. 201. Except as otherwise provided in this Act—

(1) no amount appropriated pursuant to this Act may be used for any program in excess of 105 percent of the amount authorized for that program by this Act or $10,000,000 more than the amount authorized for that program by this Act, whichever is the lesser, and

(2) no amount appropriated pursuant to this Act may be used for any program which has not been presented to, or requested of, the Congress,

unless the Secretary of Energy (hereinafter in this title referred to as the "Secretary") transmits to the appropriate committees of Congress a full and complete statement of the action proposed to be taken with respect to the program and the facts and circumstances relied upon in support of the proposed action.

LIMITS ON GENERAL PLANT PROJECTS

SEC. 202. (a) The Secretary may carry out any contruction project under the general plant projects provisions authorized by this Act if the total estimated cost of the construction project does not exceed $1,200,000.

(b) If at any time during the construction of any general plant project authorized by this Act, the estimated cost of the project is revised because of unforeseen cost variations and the revised cost of the project exceeds $1,200,000, the Secretary shall immediately furnish a complete report to the appropriate committees of Congress explaining the reasons for the cost variation.

LIMITS ON CONSTRUCTION PROJECTS

SEC. 203. (a) Whenever the current estimated cost of a contruction project which is authorized by section 102 of this Act, or which is in support of national security programs of the Department of Energy and was authorized by any previous Act, exceeds by more than 25 percent the higher of (1) the amount authorized for the project, or (2) the amount of the total estimated cost for the project as shown in the most recent budget justification data submitted to Congress, construction may not be started or additional obligations incurred in connection with the project above the total estimated cost, as the case may be, unless a period of thirty calendar days (not including any day in which either House of Congress is not in session because of adjournment of more than three days to a day certain) has passed after receipt by the appropriate committees of the Congress of written notice from the Secretary containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of the action.

(b) Subsection (a) shall not apply to any construction project which has a current estimated cost of less than $5,000,000.

FUND TRANSFER AUTHORITY

SEC. 204. To the extent specified in appropriation Acts, funds appropriated pursuant to this Act may be transferred to other agencies of the Government for the performance of the work for which the funds were appropriated, and funds so transferred may be merged with the appropriations of the agency to which the funds are transferred.

AUTHORITY FOR EMERGENCY CONSTRUCTION DESIGN

SEC. 205. The Secretary may perform planning and design utilizing available funds for any Department of Energy national security program construction project whenever the Secretary determines that the design must proceed expeditiously in order to meet the needs of national defense or to protect property or human life.

FUNDS AVAILABLE FOR ALL NATIONAL SECURITY PROGRAMS OF THE DEPARTMENT OF ENERGY

SEC. 206. Subject to the provisions of appropriation Acts, amounts appropriated pursuant to this Act for management and support activities and for general plant projects are available for use, when necessary, in connection with all national security programs of the Department of Energy.

AVAILABILITY OF FUNDS

SEC. 207. When so specified in an appropriation Act, amounts appropriated for "Operating Expenses" or for "Plant and Capital Equipment" may remain available until expended.

TITLE III—AUTHORIZATION OF APPROPRIATIONS

FOR FISCAL YEAR 1987

SEC. 301. There are authorized to be appropriated to the Department of Energy to be available not earlier than October 1, 1986, such sums as may be necessary for fiscal year 1987 for programs set forth in this Act.

FISCAL YEAR 1986 DEPARTMENT OF ENERGY DEFENSE PROGRAMS BUDGET REQUEST

House of Representatives,
Committee on Armed Services,
Procurement and Military
Nuclear Systems Subcommittee,
Washington, DC, Wednesday, February 20, 1985.

The subcommittee met, pursuant to call, at 10:05 a.m., in room 2212, Rayburn House Office Building, Hon. Samuel S. Stratton (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. SAMUEL S. STRATTON, A REPRESENTATIVE FROM NEW YORK, CHAIRMAN, PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

Mr. Stratton. The subcommittee will come to order.

We are hoping to enlist a quorum of the committee so that we can get approval for going into executive session, if need be, in the development of the testimony today. Prior to that, the Chair has a couple of nonclassified statements, and I will proceed with those at this point.

This morning, the subcommittee begins its hearings to review the fiscal year 1986 budget request for Department of Energy defense programs. These support the entire U.S. effort to design, build and maintain all nuclear weapons, to provide special nuclear materials, to design all naval reactors, manage radioactive wastes and to provide all necessary support. The President proposes a budget of approximately $8 billion, up 8.7 percent—$640 million—from fiscal year 1985.

If the DOE defense complex were a commercial industry, it would rank as one of the top 20 in the country. It is absolutely unique and critical to national security. We have no deterrent without this program.

We must never forget that we decided with our allies at the time of the Lisbon declarations that we could not match the Soviets in Europe with the 96 divisions required and that we would rely on nuclear forces to redress the balance. We must also never forget that strategic deterrence depends entirely on nuclear forces that are ready, credible and survivable.

Our responsibility is to do what is needed to maintain this unique capability for the Nation.

There are eight programs covered by this budget request. They range from nuclear weapon design, test and production activities to naval reactor design to verification of nuclear test ban treaties and finally to a new program proposed by the Department of Energy on new nuclear power sources for terrestrial and space military missions. During the next 3 days, we will hear from the managers of these programs about their requirements and the basis for this budget request.

The Department of Energy request for approximately $8 billion represents a sizable increase over that appropriated for 1985—namely, about 9 percent before inflation. It is, in fact, somewhat less than the percentage increase requested for the Department of Defense. While this appears to be a healthy increase, I urge the subcommittee to look carefully at what elements have gone to make up this increase.

A number of very expensive improvements and repairs to the production plant will be required this year, and in years to come, just to maintain our ability to produce nuclear weapons at all and, in particular, to support both the strategic modernization program and whatever realignments there might be in the deployment of nuclear weapons in NATO. The big ticket items in this budget request are precisely those plant improvements required to maintain the strategic and theater deterrents.

Hopefully, the witnesses before us today and in the next few days will explain to us how this new investment in R&D and plant will be necessary to maintain the delivery schedule of new DOD weapon systems that the Congress has already approved for deployment.

It is distressing to note that the President's budget in the area of inertial confinement fusion [ICF] would eliminate the program as a separate entity and second, reduce the funding to less than one-half of last year's request.

I mention this in particular because the Congress mandated a technical review of the ICF Program by a group of technical experts with a view to providing the Congress and DOE with advice so that priorities might be set. This budget request preempts the answer to that technical review and, in fact, would eliminate large areas of the ICF Program that could never be reconstituted.

I can see no commitment by the Department to try to maintain the ICF Program in any kind of health pending the results of the technical review. The budget proposes to reduce the force working on ICF research and is to be divided between the national labs and the other participants in the ICF Program. The amount of research support that goes to the various participants in the ICF Program appears to be determined by some arbitrary percentage of the funds available.

Finally, a comment on the inclusion of new programs in the defense program budget, such as space reactors and Strategic Defense Initiative [SDI] Program. I agree that there are important capabilities and talents at the national weapons laboratories that will be useful to support a successful program in these areas, but we must also consider the fact that we are adding non-weapons-related research and responsibilities to the national labs at a time of severe budget constraints.

I believe our responsibility should be to protect the ability of the labs to do the necessary nuclear weapons R&D. If we continue to add reactors and SDI and energy research, et cetera, and apply severe top-line constraints, the inevitable result is to draw down our capability to do nuclear weapons R&D. All these things are good, but not at the expense of the labs' primary responsibility.

Our witnesses this morning are the Honorable William W. Hoover, Assistant Secretary for Defense Programs of the Department of Energy, and the Honorable Richard L. Wagner, Jr., the chairman of the Military Liaison Committee to the Department of Energy and the Assistant to the Secretary of Defense (Atomic Energy).

They are accompanied by members of the Military Liaison Committee, General Davis, General Davidson, General May, and Commodore Bacon.

After an overview of the DOE defense programs and the relationship between DOD and DOE, we will then go to a review of the requests for nuclear weapon research, development, testing and production.

Let me, before we proceed with the testimony, welcome the new members of this subcommittee. We have found the subcommittee a rather popular one. And as members and witness may recognize, we have had to add additional space to accommodate all of those who were interested in getting onto this particular subcommittee.

We will, of course, be limited in our time this morning because a joint session of Congress will convene at 11 o'clock so that we can entertain and listen to the Prime Minister of Great Britain, but we will resume at 2 o'clock in the afternoon to continue the testimony.

Mrs. HOLT. Mr. Chairman.

Mr. STRATTON. Yes.

Mrs. HOLT. Will the gentleman yield for a moment?

Mr. STRATTON. Please, yes.

Mrs. HOLT. Since we have a quorum of nine members present, I move that the chairman be authorized to go into executive session for today and five additional consecutive days of hearings for the purpose of receiving classified information affecting the national security.

Mr. STRATTON. On that, a rollcall is required. The clerk will call the roll.

Mr. KLEIN. Mr. Stratton.

Mr. STRATTON. Aye.

Mr. KLEIN. Mrs. Holt.

Mrs. HOLT. Aye.

Mr. KLEIN. Mrs. Byron

[No response.]

Mr. KLEIN. Mr. Badham.

[No response.]

Mr. KLEIN. Mr. Mavroules.

[No response.]

Mr. KLEIN. Mr. Courter.

Mr. COURTER. Aye.

Mr. KLEIN. Mr. Skelton.

Mr. SKELTON. Aye.

Mr. KLEIN. Mr. Kramer.

[No response.]

Mr. KLEIN. Mr. Leath.

[No response.]

Mr. KLEIN. Mr. Davis.

[No response.]

Mr. KLEIN. Mr. Dyson.

Mr. DYSON. Aye.

Mr. KLEIN. Mr. Hopkins.

[No response.]

Mr. KLEIN. Mrs. Lloyd.

Mrs. LLOYD. Aye.

Mr. KLEIN. Mr. Hunter.

[No response.]

Mr. KLEIN. Mr. Ray.

Mr. RAY. Aye.

Mr. KLEIN. Mr. Spratt.

Mr. SPRATT. Aye.

Mr. KLEIN. Mr. Bustamante.

Mr. BUSTAMANTE. Aye.

Mr. KLEIN. Nine votes in the affirmative, Mr. Chairman.

Mr. STRATTON. A quorum being present and a majority voting in favor, the resolution is agreed to and we are therefore provided with authorization to close the session when required, not only on today, but, 5 successive days thereafter.

I think perhaps we might welcome in particular the two new members of our committee, Mr. Spratt from South Carolina, and Mr. Bustamante from Texas.

Mr. BUSTAMANTE. Thank you, Mr. Chairman.

Mr. STRATTON. We are delighted to have them as members of the committee.

I have one other statement that I wanted to add which I think may touch on some items that some individuals are interested in.

These hearings on the Department of Energy's defense programs and especially the hearings today, will involve highly sensitive nuclear weapons information and intelligence information that are protected by the Atomic Energy Act of 1954, as amended, and by other Federal statutes. In addition, I have noted that some of the testimony may include intelligence information protected by code word classifications. Although we have insisted that the testimony of witnesses provide complete information, the committee has always taken special precautions to limit the dissemination of this type of classified information to the minimum number of staff personnel who have the need to know the sensitive details.

The subcommittee will have to be in closed session for most of the Department of Energy hearings. So that there will be no misunderstanding, after consultation with the staff director and the counsel of the full committee, I have interpreted the intent of the new committee rule dealing with attendance of personal staff members at closed hearings to mean that such staff members are not eligible to attend closed hearings dealing with the nuclear weapons programs or during sessions where compartmented, code word, or other intelligence matters are to be discussed.

It is also my intention to exclude from these DOE hearings members of the professional staff whose duties do not include DOE defense programs.

I yield now to the gentlewoman from Maryland, Mrs. Holt, for any statement that she has.

STATEMENT OF HON. MARJORIE S. HOLT, A REPRESENTATIVE FROM MARYLAND, RANKING MINORITY MEMBER, PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

Mrs. HOLT. Thank you, Mr. Chairman.

I am certainly happy to welcome our witnesses today and to concur in the statement that the chairman has made. I wish to add a few concerns of my own. Some of them involve sensitive information so I will try to paraphrase them.

First of all, I note that the Department has made progress on the issue of the production of the new 8-inch and 155-millimeter rounds. Now that you have a production plan for these rounds, I would like to see the question addressed whether this production plan satisfies the needs of NATO and the Army and Marine Corps, and what will happen to the older 8-inch rounds as the new ones are produced.

Also, I understand that the staff's review of the fiscal year 1986 budget indicates that DOE has made major progress on a number of security-related issues and is, I hope, getting well fast. Progress in this area is commendable because of the risk to the nuclear weapon program that would come from any major breach of security and its attendant publicity.

Of course, the breach is the serious part of it.

In addition, I agree with the chairman completely that the primary responsibility of the nuclear weapon establishment is to provide nuclear weapons for national defense and that we must be extremely careful not to dilute this capability by having the labs engage in a large number of extraneous activities.

Mr. Chairman, I certainly join in your concern about the future of the inertial confinement fusion program. Over the past several years, I have personally visited the Livermore, Sandia and Los Alamos National Laboratories where this work has been done. I have also visited the KMS Fusion facility. Others, I know, have visited the excellent facilities at the University of Rochester.

The budget request now before us would devastate this important program and result in the total waste of 10 years of effort and more than $1 billion of the taxpayers' money.

I, for one, will be really crushed if it turns out this isn't where we thought we were going in the beginning because I have always had such high hopes for it.

Finally, Mr. Chairman, the budget does not adequately address the "long pole" in the weapons program tent—special nuclear materials. For 3 years now, this subcommittee has been directing the DOE to proceed with the Special Isotope Separation Program. Yet, the Department continues to drag its feet. I would hope that we can take affirmative steps to correct this problem this year. Hearings that we have had over the past several years show that the SIS Program is the most cost-effective and timely way to obtain special nuclear materials for the weapons program.

Thank you, Mr. Chairman. I hope that the witnesses will address themselves to these concerns.

Mr. STRATTON. Thank you, Mrs. Holt.

Mr. Hopkins.

Mr. HOPKINS. Mr. Chairman, I would like to ask unanimous consent to be recorded as voting aye on the previous vote.

Mr. STRATTON. Without objection, the gentleman will be so recorded.

Our first witness will be the Honorable William W. Hoover, Assistant Secretary for Defense Programs of the Department of Energy, followed by the Honorable Richard L. Wagner, Jr., Chairman of the Military Liaison Committee to the Department of Energy and the Assistant to the Secretary of Defense for Atomic Energy.

General Hoover, you may proceed with your statement.

STATEMENT OF HON. WILLIAM W. HOOVER, ASSISTANT SECRETARY FOR DEFENSE PROGRAMS, U.S. DEPARTMENT OF ENERGY

Mr. HOOVER. Thank you, Mr. Chairman.

Mr. Chairman, members of the committee, it is a pleasure to appear before you again and to testify in support of the Department of Energy's atomic energy defense activities' authorization request.

With your permission, sir, I would like to submit my prepared testimony for the record and then summarize my statement through the use of viewgraphs.

Mr. STRATTON. Without objection, you may proceed in that manner.

Mr. HOOVER. As many of you know, I have appeared before this committee over the last 5 years as Deputy Assistant Secretary for Military Application. At that time, I was a general officer on active duty. Since our last hearing, I have retired and now am the Assistant Secretary of Defense Programs and have responsibility for total defense program.

Before beginning my testimony in support of our authorization request, I would like, on behalf of all of my colleagues and those who have preceded me, to pay tribute to the Honorable Melvin Price, chairman emeritus. He has been an active member of this committee. He was an original member of the Joint Atomic Energy Committee, and served both as its Chairman and Vice Chairman. He served for 40 years. He has been a leader in military and civilian application of atomic energy and he has been largely responsible for many of the checks and balances that exist so as to ensure that there is civilian control over this very important program.

The bottom line is, we want to say thank you, Mr. Price. You challenged us and we look forward to your continued friendship.

THE HONORABLE MELVIN PRICE

Served 40 years in the Congress.

Leader in military and civilian applications of atomic energy.

Champion of civilian control of nuclear weapons; dual agency responsibility; highest quality, safety, and reliability of our systems.

Emphasis on R&D—United States has maintained technical superiority.

Mr. STRATTON. We certainly appreciate that tribute, General. I am sure that we will advise the chairman emeritus of the remarks that you have made. I know that we are all well aware that Mr. Price was with the Atomic Energy Program from the very outset and has a background and understanding of this whole area that are matched by certainly very few members of the Congress.

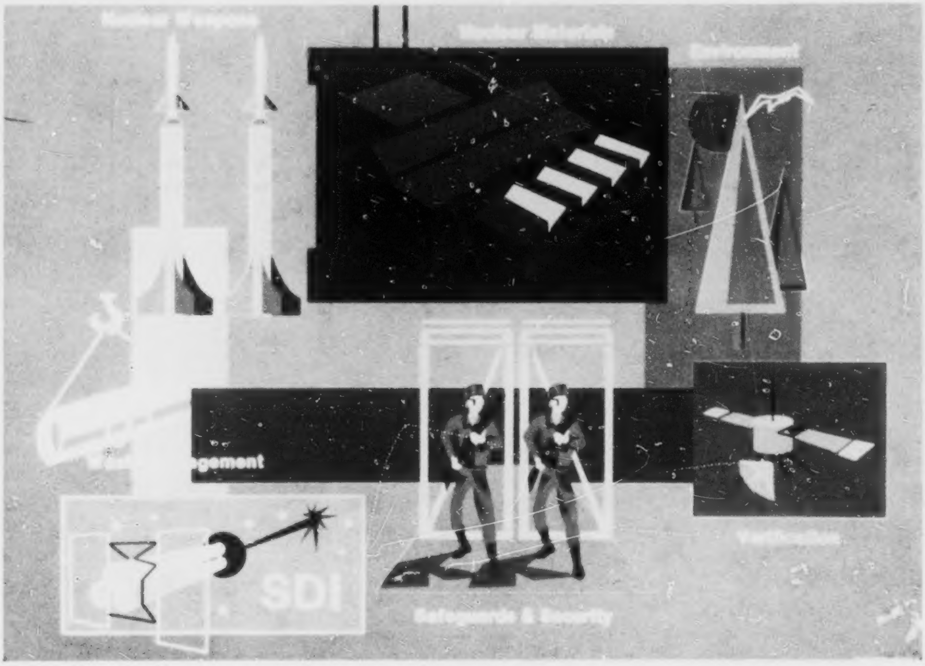
Thank you very much.

Mr. **Hoover**. I realize many members of the committee are very familiar with defense activities. We have some new members. I will try not to be redundant in presenting the programs, but I think it is important we refresh you on some of the things we do do.

DEFENSE PROGRAMS MISSION

We are responsible for weapons production, manufacture, design, research, development and testing, of the nuclear weapons we put into the nuclear arsenal. That includes some of the new, more exotic concepts in support of the President's Strategic Defense Initiative, the responsibility for the production of nuclear materials, and processing the nuclear waste that results from those activities. We also carry out very important safeguards and security and environmental protection functions to ensure that our weapons and facilities required for their production are safe and secure and that they are operated in an environmentally acceptable manner.

We also support arms control and nonproliferation activities through the important effort in verification and control technology and intelligence analysis.

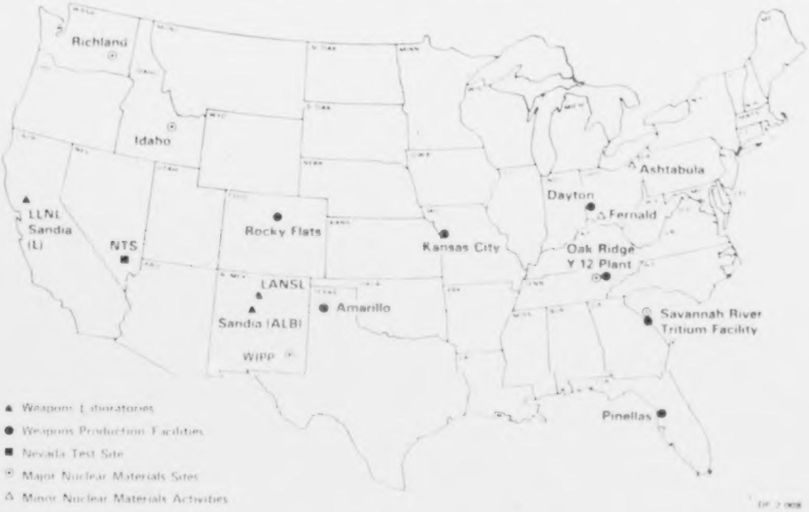


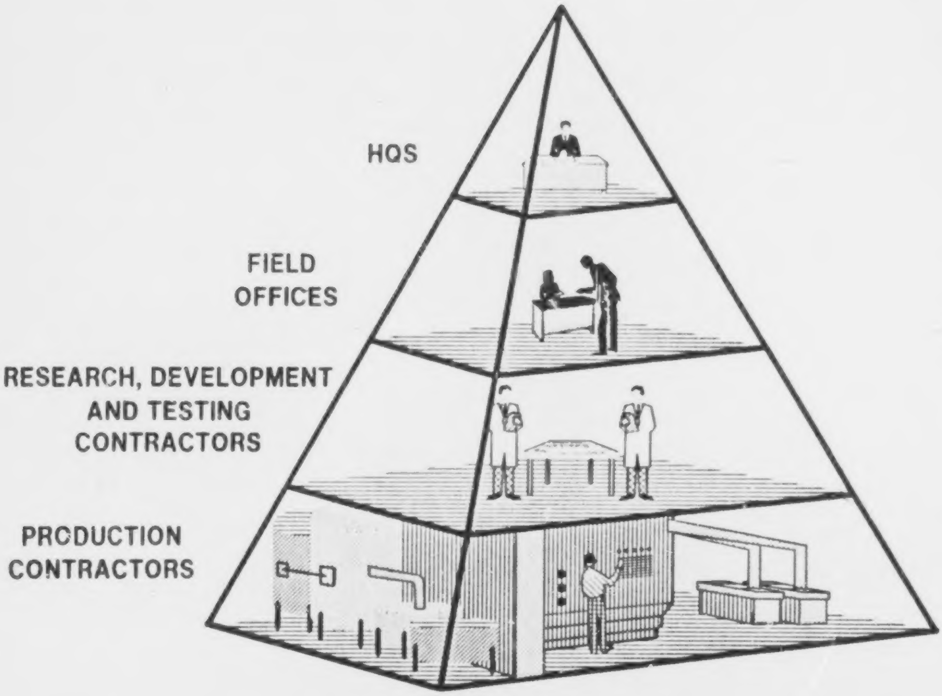
Our facilities, laboratories, weapon production plants, nuclear material production reactors and testing sites extend from coast to coast and from the northern to the southern extremes of the continental United States.

I know many of you have visited our facilities. It is a widespread complex, unparalleled in the rest of Government and certainly in American industry.

Department of Energy Defense Programs Complex

Weapons Development, Testing and Production
and Nuclear Materials Sites

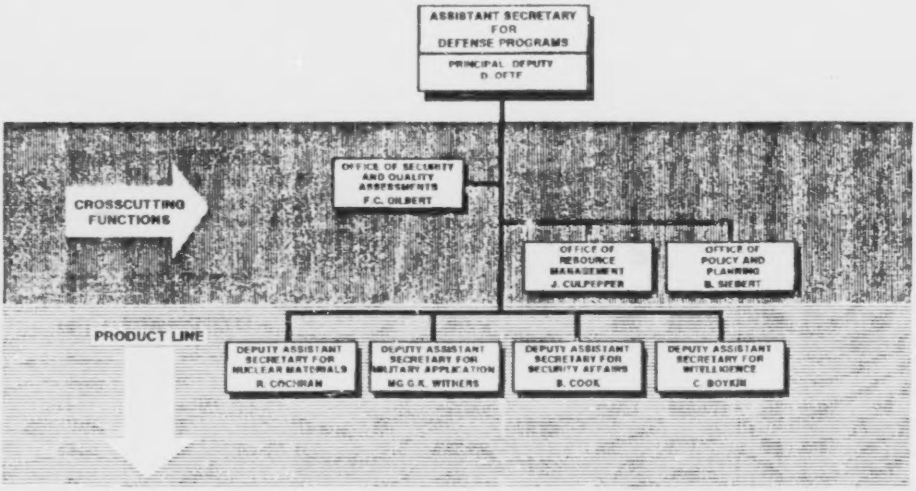

Richland
Idaho
LLNL
Sandia
(L)
NTS
Rocky Flats
LANSL
Sandia (ALB)
WIPP
Amarillo
Kansas City
Dayton
Fernald
Ashtabula
Oak Ridge
Y 12 Plant
Savannah River
Tritium Facility
Pinellas
▲ Weapons Laboratories
● Weapons Production Facilities
■ Nevada Test Site
⊙ Major Nuclear Materials Sites
△ Minor Nuclear Materials Activities


HQS
FIELD
OFFICES
RESEARCH, DEVELOPMENT
AND TESTING
CONTRACTORS
PRODUCTION
CONTRACTORS

Mr. Chairman, you already allowed that we would rank in the top 20 companies in the United States. I have made an analogy in the past comparing the weapons complex to the "Fortune 500" companies in size and scope. I think we do fall into that category. I would like to consider ourselves and the way we do our business as a corporation in many respects. We are organized not unlike many major corporations with corporate function here in Washington. We administer many of our day-to-day activities through important field offices run by field office managers who could be called our operating vice presidents at these various locations.

Perhaps unparalleled in the rest of American industry is the highly integrated R&D activity in our production complex. Therein lies one of the real strengths of our activities.

DEFENSE PROGRAMS


ASSISTANT SECRETARY FOR DEFENSE PROGRAMS
PRINCIPAL DEPUTY D. OFTE
CROSSCUTTING FUNCTIONS
OFFICE OF SECURITY AND QUALITY ASSESSMENTS F.C. GILBERT
OFFICE OF RESOURCE MANAGEMENT J. CULPEPPER
OFFICE OF POLICY AND PLANNING B. SIEBERT
PRODUCT LINE
DEPUTY ASSISTANT SECRETARY FOR NUCLEAR MATERIALS R. COCHRAN
DEPUTY ASSISTANT SECRETARY FOR MILITARY APPLICATION MG G.K. WITHERS
DEPUTY ASSISTANT SECRETARY FOR SECURITY AFFAIRS B. COOK
DEPUTY ASSISTANT SECRETARY FOR INTELLIGENCE C. BOYKIN

I have made some organizational changes since I have become Assistant Secretary for Defense Programs. Conceptually, what I am trying to do is to ensure that my product managers, those individuals responsible for getting product out the door, can concentrate their attention on those program activities under their purview.

At the same time. we have a number of what I would call crosscutting functions which are taking up an increasing amount of their time and effort. We have done some organizational restructuring so such things as safeguard and security inspection and evaluation functions and other crosscutting functions in environmental safety and health protection areas attain better management focus.

I would like to introduce my new team. Mr. Don Ofte, who is equivalent to my executive vice president, is not with us today but will be testifying before you tomorrow; Dr. Charles Gilbert, head of the new office created to look specifically at the security inspection and evaluation and the environment and health and safety functions I just mentioned; Mr. Jim Culpepper heads up the Resource Management area, and Mr. Byran Siebert is in charge of Policy and Planning.

My deputy assistant secretaries have not been in the job much more than a year. They are Mr. Ron Cochran, who has testified before you previously as Director of the Office of Materials Production and is now the Deputy Assistant Secretary for Nuclear Materials; Maj. Gen. G. Kenyon Withers who joins us from the Army Corps of Engineers is the Deputy Assistant Secretary for Military Application; and Mr. Billy Cook, who just retired from the U.S. Army where he had important responsibilities with regard to NATO weapons safeguard and security activities, is the Deputy Assistant Secretary for Security Affairs. Mr. Charles Boykin continues as Deputy Assistant Secretary for Intelligence.

This, coupled with my operating vice presidents in the field who have, with one exception, come on board in the last 4 years, represents a changing of the guard. This is your new defense program team, sir.

We remain dedicated to the defense business and intend to keep you fully informed.

POLICY EMPHASIS

Safety.
Security and safeguards.
Environmental concerns.
Good neighbors.

Mr. HOOVER. Before proceeding with some of the authorization requests, I would like to share with you some of my concerns and my individual priorities, aside from those that are fundamentally addressed to fulfilling our national security goals. These concerns or priorities arise in large measure because we must not only do a good job, but we must also be perceived as doing a good job. If the public has concerns about safety, security, and environmental protection, we want to be able to treat those areas in such a manner that they do not blur the important dialog and debate that must go on with regard to the important role of nuclear weapons in the national security effort.

So I would like to touch briefly on some of the things we are doing in these areas and make remarks in each case.

SAFETY

We operate right now four, soon to be five, production reactors that are not unlike large nuclear power reactors. We have to deal with the radioactive waste that is generated from those reactors. We also employ a number of other conventional industrial practices that generate other toxic wastes.

We operate as an industry that has to take into account a number of hazardous operations. Because of the nature of our business, we probably have a greater challenge than confronts any other industry. Nonetheless, our safety record in terms of our accident and injury rate is four times better than industry's. I think that is a tribute to the kind of people we have who are dedicated to this business. The bottom line is that we are not going to compromise on safety.

SECURITY AND SAFEGUARDS

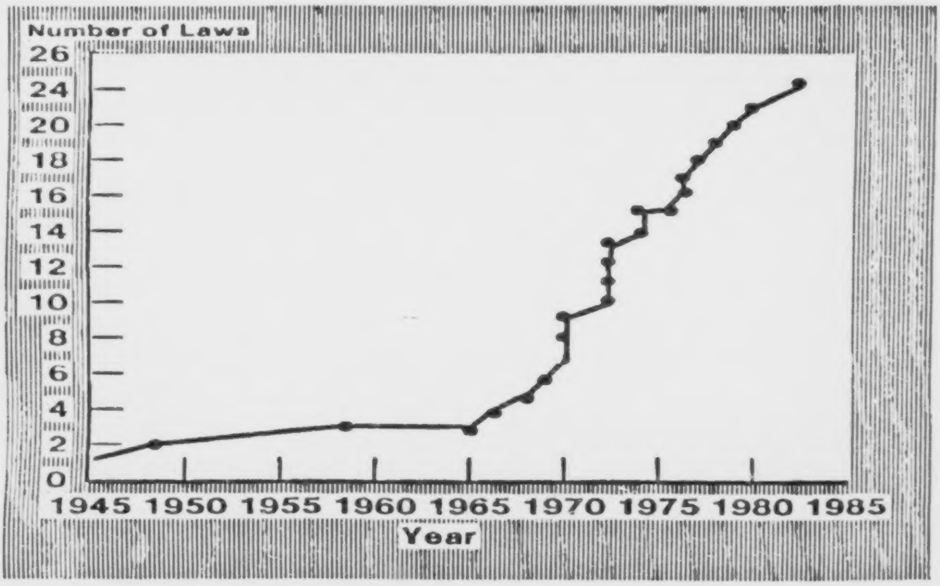
I have already mentioned the heightened awareness given to the security and safeguards of our nuclear weapons. The Congress and the administration have given a lot of attention to that area in recent years. You will get a separate hearing on this whole subject so I will just skim the surface, but I am pleased to report that I think we have turned the corner. We still have more to do, but we have improved the situation considerably over the last 2 years through upgrades to our physical security apparatus. We have added a considerable number of guards and given them the training, motivation and direction such that I think we have a guard force that is becoming second to none.

We continually evaluate the performance of our security. We do that through the inspection and evaluation function which reports directly to me. I get timely input on what the problems are and can direct timely response on how to take care of those problems. We stress the system until we can determine where it will break. We want to know where our security problems are. If you don't stress the system to come up with some deficiencies, you won't know where your weaknesses really are, so as to be able to go out and fix those weaknesses.

So you are going to hear from time to time where one of our facilities may not have done as well as we would like in a force on force situation. In those cases we actually put in mock terrorist forces. Again, we are not going to know where those weaknesses are unless we go ahead and really put a strain on the system.

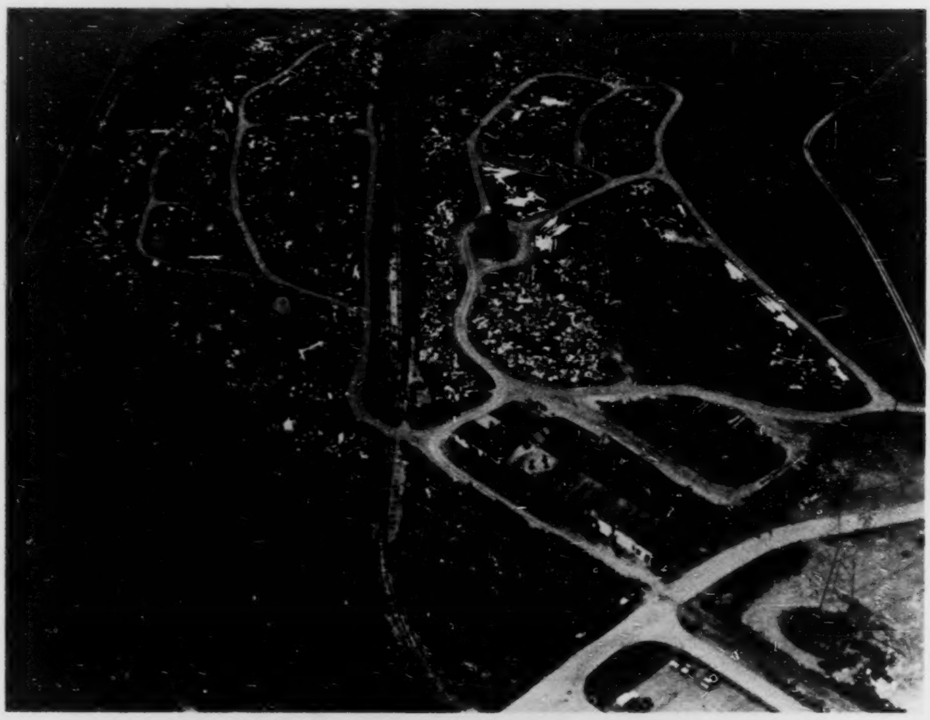
I am happy to report, and I could not have done this last year, that if you wanted to categorize the status of our security from satisfactory to unsatisfactory, a number of our critical facilities which would have fallen into the unsatisfactory category last year are now satisfactory. Today we have made a great deal of progress. We do have more to ~~do, but I do~~ think we have turned the corner.

ENVIRONMENTAL ACTIVITIES

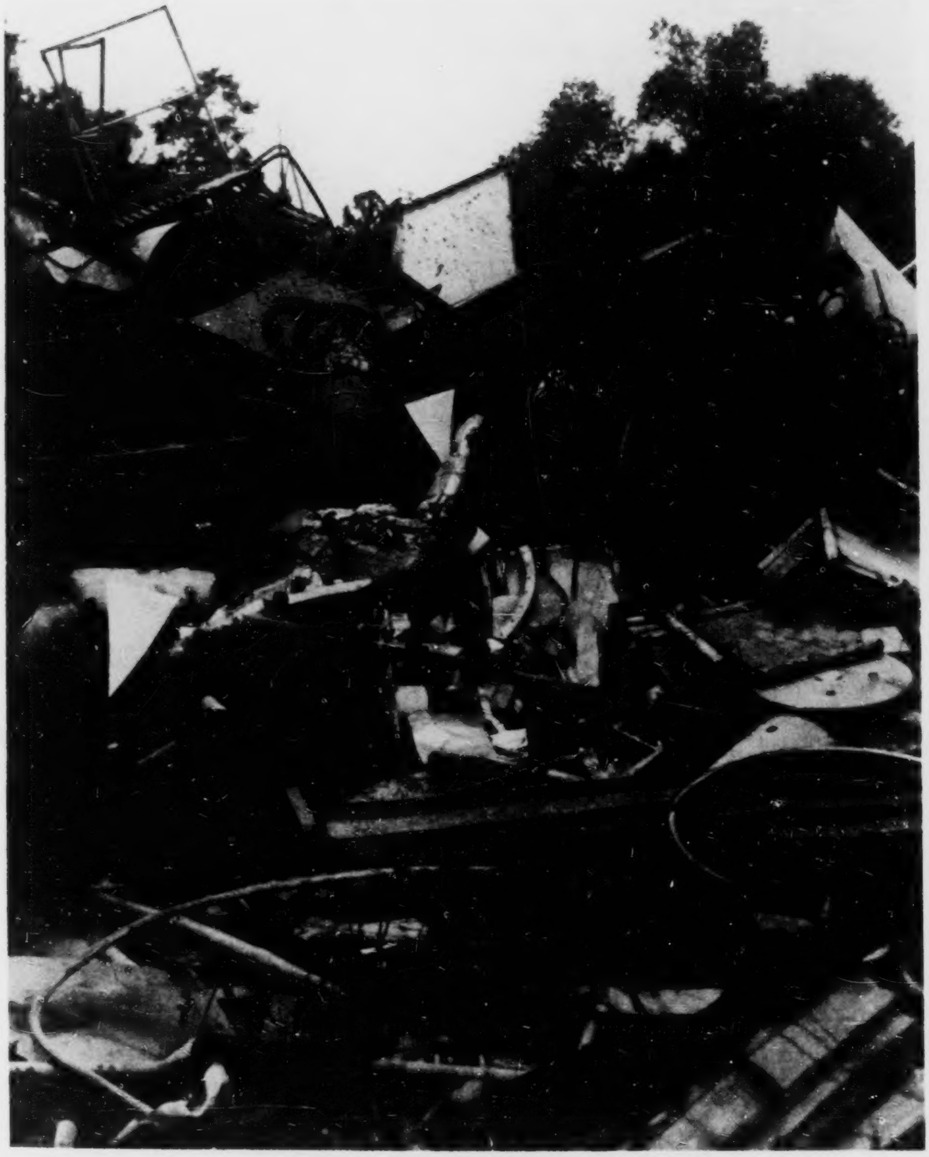


Many of you are certainly aware of the almost exponential explosion of environmental laws that have come on the books in the late seventies and in the 1980's. Like much of the rest of American industry, we have a lot of industrial practices which were accepted several years ago that we now must correct to come into compliance with the law. That is an expensive proposition.

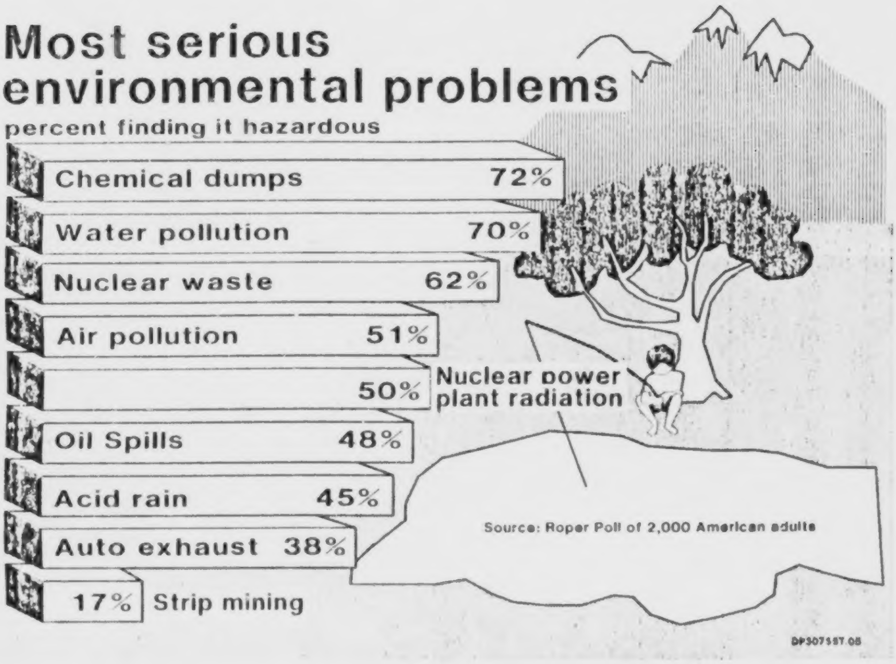
We are proceeding in that area. You will get a separate session tomorrow on what we are doing in this area but I did just want to skim the surface for you.



We have numbers of examples of areas that we are going to have to do something about. Here is a dump site we are going to have to take care of.

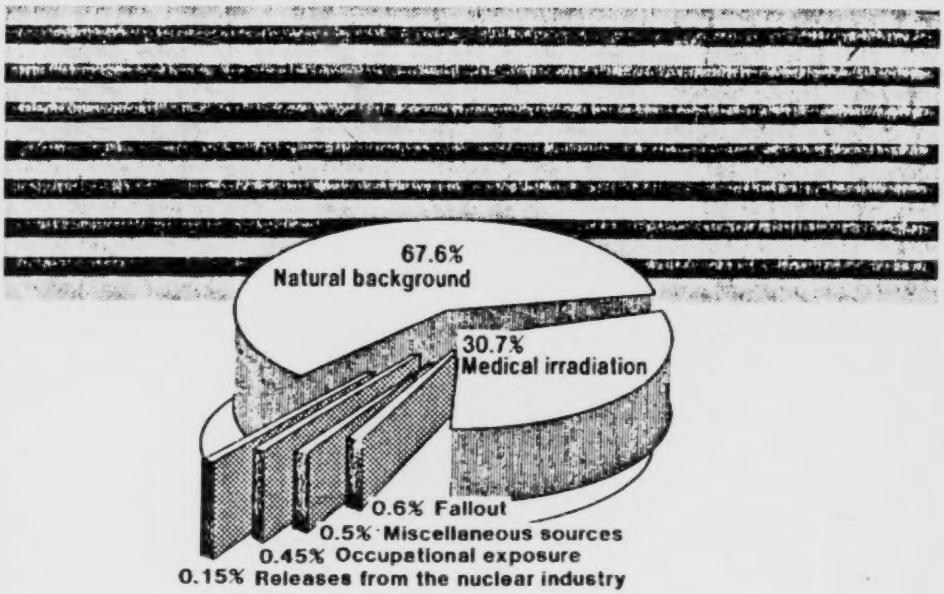


This is a closeup picture of the same dump site that shows you some of the kinds of problems for which we are going to be coming to you with funding requests.



Source: Roper Poll of 2,000 American adults

I think there is no question that the American public is concerned about a large number of environmental problems. If we just look at the top five concerns, we have to deal with all of those at most of our sites, particularly chemical dump problems. Interestingly though, the one that seems to get the most attention stems from our association with radioactive materials.



Public perceptions are not always correct. Sometimes the real risk is not the risk that is perceived. This slide shows that while the public is very concerned about radiation hazards from the nuclear industry, their day-to-day exposure to natural background radioactivity is such that any additional contribution we make to that is miniscule.

In dealing with government officials at all levels and with the public, we are really trying to sit down and look at both the benefit and the cost of the options open to us so that we can achieve a reasonable balance. We must not only protect the public, but also remember that the public is the taxpayer. So we try to come to some agreement——

Mr. STRATTON. General, would you leave that slide up.

When you talk about natural background are you talking about radon?

Mr. HOOVER. Flying cross-country in a jet aircraft, sir. You get more radiation——

Mr. STRATTON. Is there any other? These would be the rays from outer space, right?

Mr. HOOVER. Living in the city of Denver, you get more radiation than you do living in Washington. It is radiation that occurs naturally.

Mr. STRATTON. What part does radon play in comparison to the others?

Mr. HOOVER. I am not expert enough to answer that question. Dr. Gilbert is one of my experts here who can answer that.

Dr. GILBERT. Radiation that occurs naturally is about 100 millirem per year. A human being receives that dose anywhere on the Earth. Most of that arises from cosmic rays and radiation coming out of materials, our own ground and rocks and so on. Granite is a source of such radiation.

Mr. Stratton. I was trying to find out how much comes from cosmic rays and how much from radon.

Dr. Gilbert. I think the bulk of it comes from cosmic rays. However, there are some people living in houses in certain areas of the Earth where there is radon coming from natural materials, where they get larger exposures, particularly if they live in an enclosed house that is built over granite or rocks that have radon coming from them.

Mr. Stratton. Thank you.

On the chart when you talk about medical irradiation, you are talking about x-rays?

Mr. Hoover. Yes, primarily x-rays.

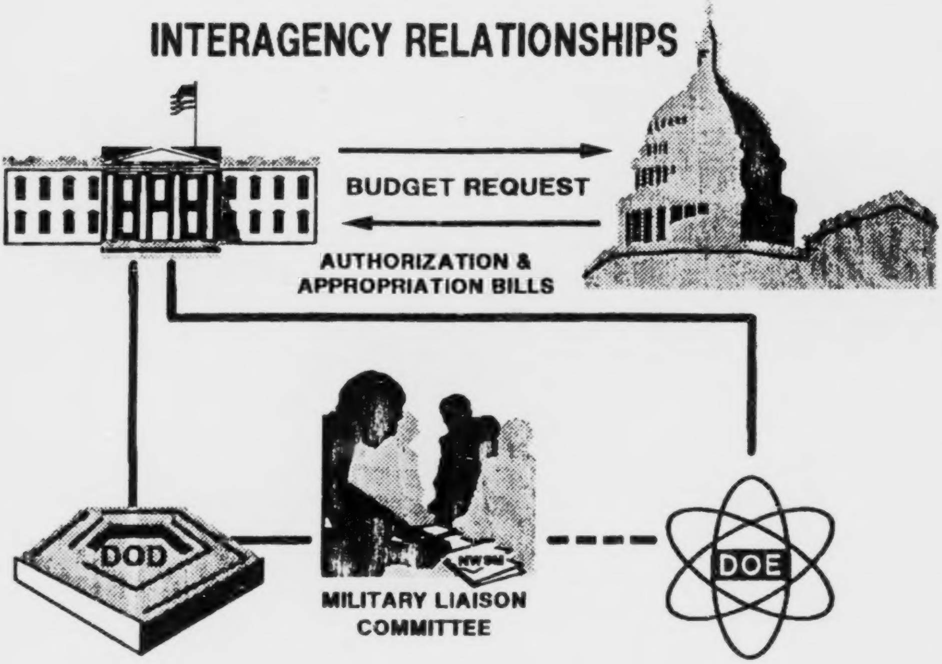
Mr. Courter. Why do you call it irradiation?

Dr. Gilbert. It has the same meaning as radiation.

Mr. Hoover. Nonetheless, we do attract a lot of attention when we have a problem of an environmental or security nature. We get a lot of media attention. That does not help the general public's attitude about what we do.

COMMUNITY BLOOD BANK

There are a lot of good news stories that I just want to briefly mention that don't often get mentioned. At all our facilities, we have a great deal of community involvement. We want to be good neighbors. We have education programs where we bring in high school students and teachers, and expose them to high technology techniques in a learning situation. These stories never seem to get media attention, but we do contribute to the general well being of our communities, and I think that contribution is a credit to the kind of people we have in this business.


INTERAGENCY RELATIONSHIPS
BUDGET REQUEST
AUTHORIZATION & APPROPRIATION BILLS
DOD
NWSM
MILITARY LIAISON COMMITTEE
DOE

Turning now to our budget request, we do not come to the Congress solely on the basis of what we in the Department of Energy think are necessary in terms of warhead requirements. We have a great deal of interaction with the Department of Defense. The law requires Presidential approval of all weapons to be built. The Nuclear Weapons Stockpile Memorandum submitted to the President is the vehicle for this approval. This document forms the basis of our request to you in terms of the number of warheads to be produced over certain periods of time and the nuclear material required to support those warhead production requirements. We then come to the Congress with our authorization and appropriation request.

NUCLEAR WEAPON BUILDS

One indicator underlying our budget request is the number of nuclear weapons we are going to build. As you can see, we have been progressing up a very steep production schedule, or a mountain as we like to call it, because it doesn't seem to move. Nonetheless, I think our progress is a credit to the defense community.

You can see we came from a very quiescent period in the late seventies, to a rather significant rate today. We have been able to gear up to meet that production rate. So that is part of the good news story.

Mr. COURTER. Is that warheads or yield? What is it?

Mr. HOOVER. That includes new warhead production, refurbishment, modernization of some older warheads, and that kind of thing, but basically it is our workload production.

Again, General Withers will show you how that translates into workload later today.

Mr. COURTER. [Deleted.]

Mr. HOOVER. Yes, per year.

Mr. COURTER. New or refurbished?

Mr. HOOVER. New and refurbished. Actually, we will produce [deleted] new warheads. The rest of it is improving older warheads in the stockpile, but significant refurbishments are what we are talking about here, so much so that it is a workload driver. Many people think we are just continuing to build nuclear warheads and that the arsenal is continuing to rise. We have been turning over old weapons as they become obsolete with more modern warheads that have safety and security features. That we all want to subscribe to.

Mr. STRATTON. Mr. Mavroules.

Mr. MAVROULES. Sorry to interrupt, Mr. Hoover, but I just want to be recorded as in favor of going into executive session.

Mr. STRATTON. Without objection, the gentleman will be so recorded.

Mr. HOOVER. The other more visible indicator of what is underlying our budget request is the requirement for nuclear material as shown here. Simply stated, we have a supply and demand situation. We have barely been staying above the demand curve.

[Deleted.]

We have not been able to achieve that yet and, quite frankly, it has almost been hand-to-mouth some months to make sure that we have enough material to turn out weapons on schedule. [Deleted.]

INVESTMENT STRATEGY: 1985-2000

Meet production.
Assure superiority through RD&T.
Restore and revitalize aging facilities.
Assure safe, secure, and environmentally acceptable operations.
Support arms control and verification.

Like any good corporation, we do have an investment strategy that we have been pursuing in the decade of the eighties as we look to the future. Let me put some numbers around that. We think we should have a production complex that can produce the components for warheads and the nuclear materials.

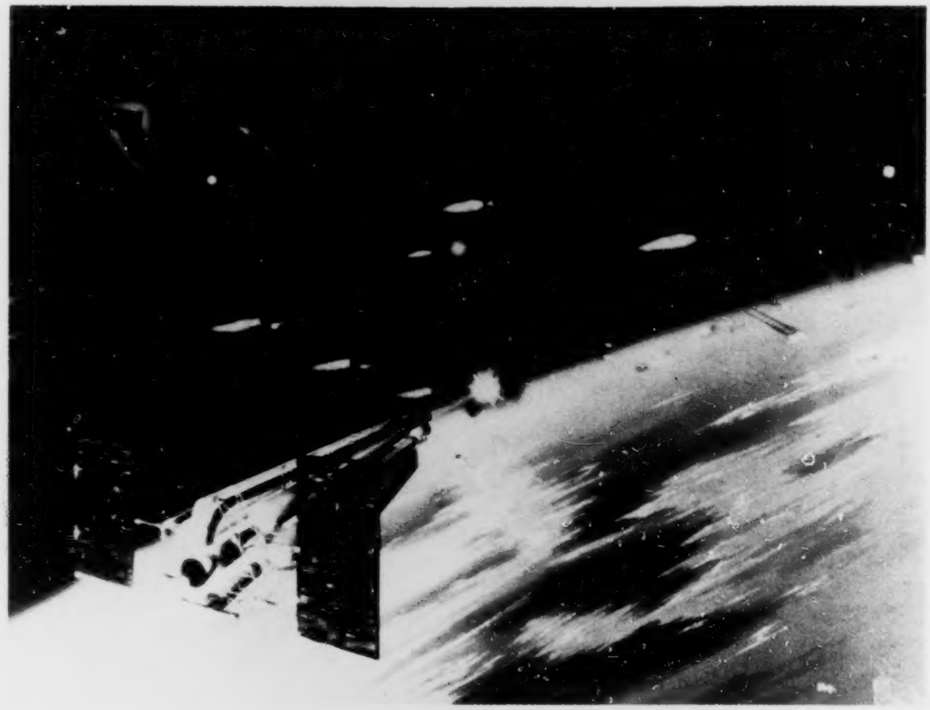
We believe we also need to continue to assure our defense superiority through a strong R&D program.

Back in 1980, we had about 7,400 full-time equivalent employees in our laboratories. We have been increasing our manpower in those areas. We are striving for a base of about 8,500 laboratory employees in this decade. We have not quite gotten there yet, and we have more to do in that area.

Many of our facilities were built in the 1940's and 1950's. We have a continuing problem to keep those facilities modern and up to date. We have gotten considerable support from this committee to accomplish this in what we call our Restoration and Revitalization Program. I touched earlier on our safeguards, security, and safety areas.

We have more to do in the environmental area and you will hear more about that tomorrow.

Finally, we are giving increased emphasis to arms control activities by way of our verification and control technology effort.



A subset of the R&D program is support of the President's strategic defense initiative. It is still very much in the research stage. The President has said that he would like to achieve a change in our basis for strategic deterrence from one of offense to one of defense. There are nuclear concepts that we feel may contribute to that goal, although I think the ultimate objective would be to have a non-nuclear defensive system. We must be aware of what the capabilities are for the Soviet Union because they do not operate under the same constraints that we operate under. Also, there may be near term strategic defense concepts that may not yet be feasible from a non-nuclear standpoint.

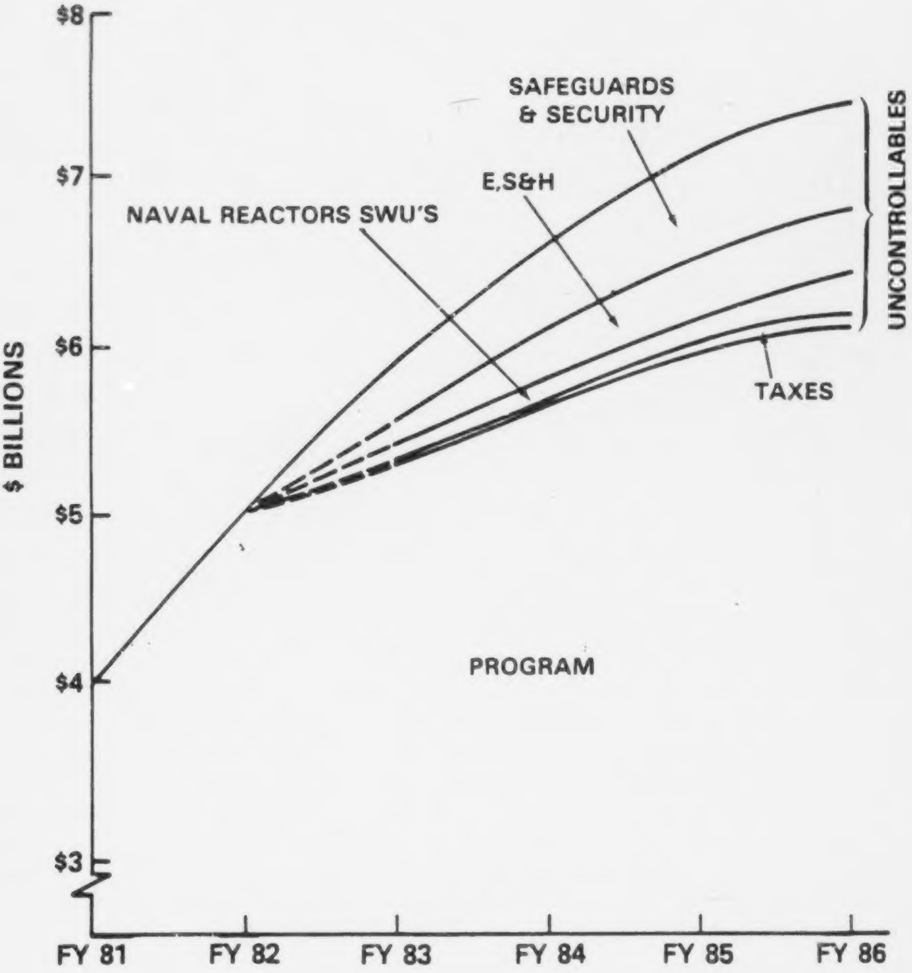
So we have a reasonable effort in support of the President's initiative.

Last year there was considerable concern, raised about how efficient we were on the job, or how cost effective we were in producing weapons. We have been giving this whole area a lot of effort and you will hear more on this later.

I will only say now that from our last year's estimates of weapons cost increases to this year's, I think we have made progress. There are some very good reasons that some of those costs are still high and we can explain those in more detail when necessary.

DEFENSE PROGRAMS FUNDING — FY 1981-1986

(FY 86 CONSTANT DOLLARS)



BC 0211

Our overall budget request, the bottom line, reflects a 9-percent increase over last year's budget. When you factor inflation out, that means a real growth increase of about 4 percent.

Mr. HOOVER. But that 4 percent——

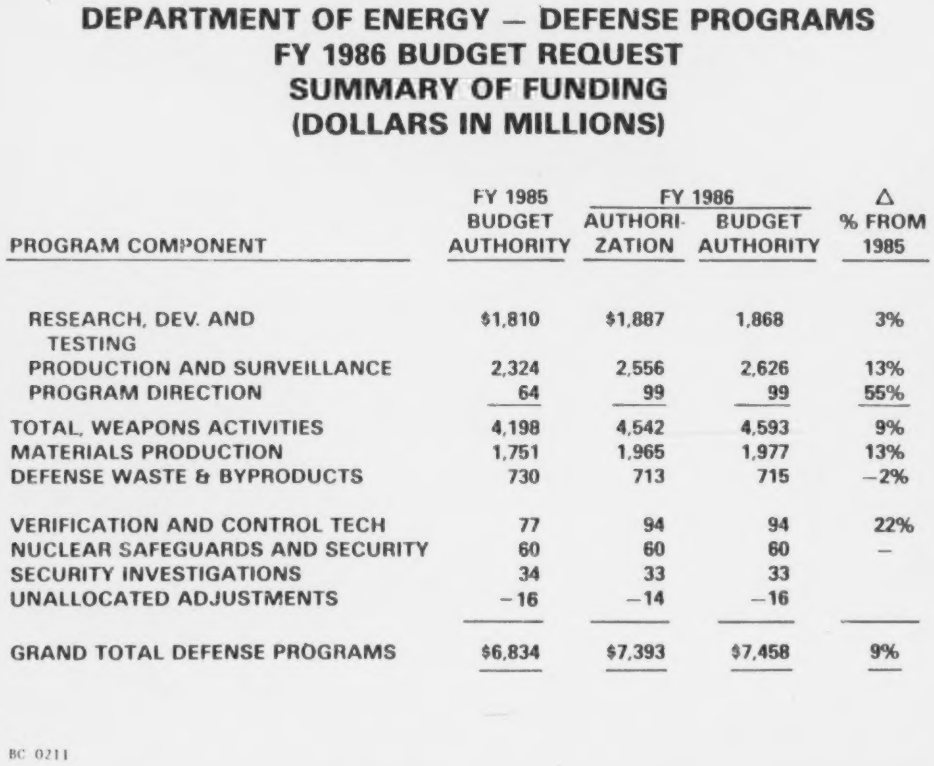
Mr. KLEIN. General, I think we must point out here that this does not include the Naval Reactors Program.

Mr. HOOVER. Excuse me.

Mr. KLEIN. Or the so-called Space Power Program.

Mr. HOOVER. Yes, sir, this is just the budget that comes specifically under my cognizance as Assistant Secretary for Defense Programs. The total President's budget for Atomic Energy Defense Activities is about $8 billion. The other DOE defense programs total about $600 million

Again, the percentage is about the same, 9-percent growth and about a 4-percent real growth.

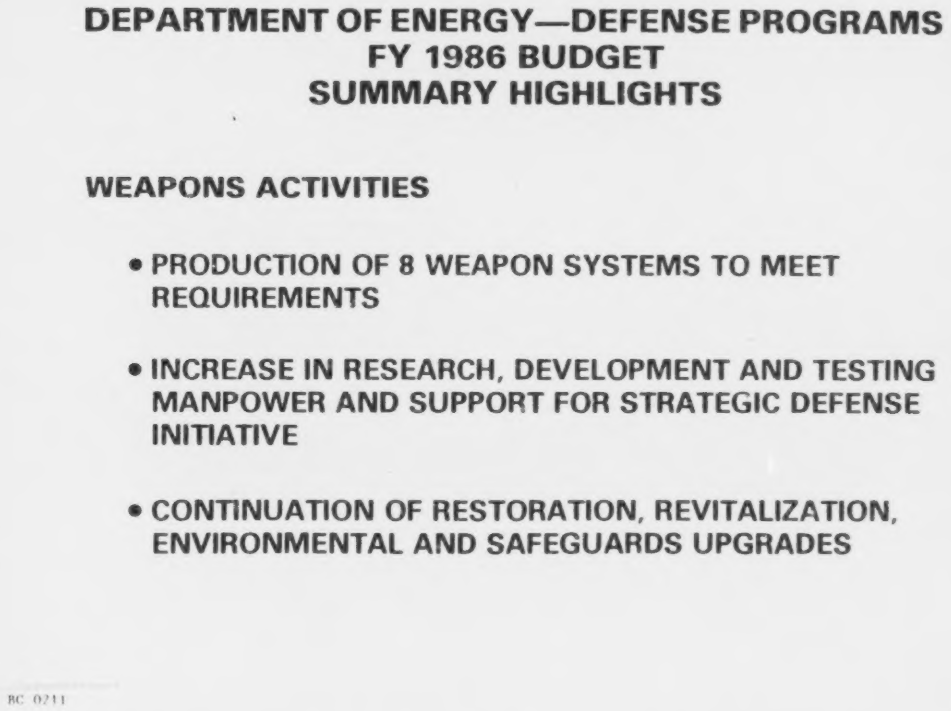


DEPARTMENT OF ENERGY – DEFENSE PROGRAMS
FY 1986 BUDGET REQUEST
SUMMARY OF FUNDING
(DOLLARS IN MILLIONS)

PROGRAM COMPONENT	FY 1985 BUDGET AUTHORITY	FY 1986 AUTHORIZATION	FY 1986 BUDGET AUTHORITY	Δ % FROM 1985
RESEARCH, DEV. AND TESTING	$1,810	$1,887	1,868	3%
PRODUCTION AND SURVEILLANCE	2,324	2,556	2,626	13%
PROGRAM DIRECTION	64	99	99	55%
TOTAL, WEAPONS ACTIVITIES	4,198	4,542	4,593	9%
MATERIALS PRODUCTION	1,751	1,965	1,977	13%
DEFENSE WASTE & BYPRODUCTS	730	713	715	−2%
VERIFICATION AND CONTROL TECH	77	94	94	22%
NUCLEAR SAFEGUARDS AND SECURITY	60	60	60	–
SECURITY INVESTIGATIONS	34	33	33	
UNALLOCATED ADJUSTMENTS	−16	−14	−16	
GRAND TOTAL DEFENSE PROGRAMS	$6,834	$7,393	$7,458	9%

BC 0211

But all of that so-called real growth is really not devoted solely to activities that get weapons out the door. There have also been considerable increases in recent years, in expenditures for safeguards and security, the environmental areas, and for State taxes assessed directly on the program. If you look at our real growth in terms of turning products out the door, is only about 2 percent.



DEPARTMENT OF ENERGY—DEFENSE PROGRAMS
FY 1986 BUDGET
SUMMARY HIGHLIGHTS

WEAPONS ACTIVITIES

- PRODUCTION OF 8 WEAPON SYSTEMS TO MEET REQUIREMENTS
- INCREASE IN RESEARCH, DEVELOPMENT AND TESTING MANPOWER AND SUPPORT FOR STRATEGIC DEFENSE INITIATIVE
- CONTINUATION OF RESTORATION, REVITALIZATION, ENVIRONMENTAL AND SAFEGUARDS UPGRADES

BC 0211

Nonetheless, we do believe that we can produce the warheads that are requested and approved by the President.

We believe that we need some increase in our research and development base, including support for the President's strategic Defense Initiative, that we have to continue our revitalization and restoration program and our environmental and safeguards upgrades.

MATERIALS PRODUCTION AND DEFENSE WASTE

Production of nuclear material to support requirements and continuation of R&D for future supply.

Funding for enriched uranium to support the nuclear Navy.

Continuation of waste operations, construction of waste isolation pilot plant and defense waste processing facilities.

We will be able to produce the nuclear material we need in the near term. We fund the enriched uranium support to the nuclear Navy which is a significant requirement of ours and we have to continue our various defense waste activities.

DP OBJECTIVE

To provide and maintain a nuclear weapons complex with sufficient capacity and capability to assure a prudent level of flexibility in national security options.

There is also risk in any budget. As I said, we are operating on a very thin margin with regard to nuclear material production. We are competing the inertial fusion program against the rest of our weapons research and technology base. That will cause some adjustments to be made in that area.

Nonetheless, I think we have come to you with a budget that will help us preserve flexibility in dealing with the national security options.

The Soviets watch us very closely. They know when we have blocked out a future option. We believe it is important as we go to the negotiating table that the Soviets view us as dealing from a position of strength. Nonetheless, we are not unmindful of the deficit problems that face the country. We think our budget is a reasonable balance.

Thank you, sir.

PREPARED STATEMENT OF WILLIAM W. HOOVER

INTRODUCTION

Mr. Chairman and members of the committee, it is my pleasure to appear before this Committee once again to testify in support of the Department of Energy's Atomic Energy Defense Activities authorization request. But first, on behalf of all those working with me and those who have preceded me in carrying out the program for development of the United States nuclear strategic forces, it is most important that I appropriately acknowledge our enormous debt to the Chairman Emeritus of the House Armed Services Committee, the Honorable Melvin Price. Through his original membership and service as chairman and vice chairman on the Joint Committee on Atomic Energy, and his equally important service on this Committee, he has played a leading role in our nuclear weapons program through his statesmanlike leadership, wisdom, and foresight.

His early insistence on civilian control of the atomic energy program has preserved this Nation's original appreciation for the very fundamental difference between nuclear weapons and conventional arms. Through the interaction between the responsible civilian agencies and the military, the best possible system of checks and balances has been established to prevent any possible misuse and to ensure achievement of the highest standards of quality, safety, reliability, and effectiveness of our nuclear arms.

His emphasis over the years on the importance of research and development in the nuclear field has enabled the United States to maintain technical superiority as other nuclear powers came on the scene. And just as important, that atomic research program has made nuclear technology among the best understood in terms of biologic and environmental interaction of any recent technological advance in our society. These research efforts have rendered possible both our effective nuclear deterrent policy and our understanding and profound respect for the effects of nuclear war.

He leaves us with a challenge to continue in his footsteps. But we know that we may continue to enjoy his friendship and his counsel.

During the last 5 years when I appeared before this committee, my responsibility had been the Department of Energy's Weapons Program. Now I come before you as the Assistant Secretary, with responsibility for all of the Department of Energy's Defense Programs. Today I would like to share with you my personal concerns and some of the challenges we face in successfully managing our varied activities, in the context of the Department's funding request that is before you. Each of the programmatic Deputy Assistant Secretaries and the Weapons Laboratory Directors will present the details of their plans for the coming year in the testimony to follow.

The Defense Programs mission is indeed varied. We design, test, manufacture, and support all of the United States' nuclear weapons. We produce the nuclear materials, primarily plutonium and tritium, and budget for the separative work needed to produce the enriched uranium necessary to run our production reactors, to build weapons for the stockpile, and to fuel the nuclear Navy. We provide for both interim and long-term management of our radioactive and other wastes. We support the United States arms control and nonproliferation activities with treaty verification systems and hardware, export control tasks, and intelligence analysis. And, very importantly, we perform all of these functions, many of which are unique and some of which are potentially hazardous, with the highest standards of safety; with the nuclear material safeguards and security measures necessary to prevent any improper access to our nuclear weapons, facilities and sensitive materials; and with appropriate concern for protection of the environment.

Since last year's hearing we have realized a number of outstanding achievements in Defense Programs. Although the various witnesses will be covering them in detail, I would like to highlight several of the more significant ones: met the most demanding requirement for delivery of new weapons to the Department of Defense since 1974; demonstrated scientific progress and increased understanding in research and development on advanced weapons concepts; realized greater benefits from our continuing efforts to increase productivity and reduce costs in our weapons laboratories and production plants; set a new record for the production of nuclear materials with our reactors at Savannah River; reactivated ahead of schedule the plutonium recovery plant at Richland and exceeded production goals; made major strides toward permanent disposal of defense waste. All of these are important contributions to the successful accomplishment of our Defense Programs mission.

Shown here is a map that depicts the operating location of our various facilities—stretching from coast to coast and from the northern to southern extremes of the continental United States.

Like a national corporation, we have a large and important task. In my previous testimony, I compared the weapons complex to such an organization—to one of the "Fortune 500" in size and scope. We have a well-defined and integrated corporate-type structure with the appropriately delegated authorities and responsibilities for our various activities.

At the corporate level here in Washington, we have made some organizational changes in order to assure independent oversight of certain crosscutting functions and attain better management focus and integration among the various programs. I believe these changes will assist us in successfully carrying out our tasks with the continued confidence of the Congress, the public, and the Department of Defense. Further, three of my four Deputy Assistant Secretaries have been newly appointed to their current positions. All of these members of the Defense Programs team are here today and I would like to introduce them to you, starting with Mr. Donald Ofte.

If I were to continue the corporate analogy, Mr. Ofte, my Principal Deputy, would be the Executive Vice President. Before joining my office last fall, he served as Deputy Manager of our Albuquerque Operations Office. I rely heavily on him to manage Defense Programs when I am out of town, and otherwise to generally assist me on a broad range of assignments.

Dr. F. Charles Gilbert runs the newly established Office of Security and Quality Assessments. This office, which reports directly to me, is responsible for two very important functions: safeguards and security inspections and evaluations; and environmental, safety, health and quality assurance functions. Later, I will say more about these essential functions of this new office. The other two offices, which already existed, also have crosscutting functions and have been given additional responsibliities and staff. The Policy and Planning Office is directed by Mr. Bryan Siebert, and Resource Management by Mr. James Culpepper.

Now let me move down the chart to the organizational line of Deputy Assistant Secretaries who, in the industrial world, would be vice presidents, each heading a major product line of our firm. Mr. Ronald Cochran, whom you will remember as our former Director of the Office of Materials Production, is the new Deputy Assistant Secretary for Nuclear Materials.

Our newly appointed Deputy Assistant Secretary for Military Application, Major General G. Kenyon Withers, has come to us from the Department of the Army, where he was Deputy Assistant Chief of Engineers.

Mr. Bill Cook is now our new Deputy Assistant Secretary for Security Affairs. He recently has retired from the Army, and most recently was responsible for the security of the U.S. nuclear weapons in NATO. Each of these members of our Defense Programs management team will testify later, describing his program plans for fiscal year 1986.

Last, but by no means least, is Mr. Charles Boykin, our Deputy Assistant Secretary for Intelligence, with that responsibility for the entire Department of Energy. His program and funding request will be covered by Mr. Cook in his presentation; but, of course, Mr. Boykin, who has been in his position for just more than one year, is here to answer any questions you may have.

My corporate staff, which I have just introduced, and the Operations Office Managers, my operating vice presidents, in our principal field offices, all but one of whom have been appointed to their respective positions within the last 4 years, represent the new Defense Programs management team—the changing of the guard. A team that is dedicated to excellence and solving our problems in an open and forthright manner. In keeping with this approach, I want to assure you that we will be in communication, informally and formally through the Departmental channels as appropriate, to keep you fully and currently informed and as necessary to seek your approval of such program changes as may be required in the accomplishment of our mission.

PERSONAL POLICY

Before we discuss our program requirements underlying the Department's FY 1986 authorization request, I want to share with you my personal priorities, other than the fundamental priority of meeting the product goals of National security, which I consider important to this task. They flow from the basic fact that we must do our job, and do it well, but we also must be perceived as doing a good job—by the public, the Congress, the rest of the administration, and closest to home, within the Department of Energy. Accordingly, I am devoting increased management attention to safety in all its dimensions, safeguards and security, environmental concerns, and our responsibility to be a good neighbor at all of our locations. Doing a good job in each of these areas of responsibility is of vital importance if we are to continue meeting the Nuclear Weapons Stockpile Memorandum requirements with the best nuclear weapons that can be built.

However, the public concern for environmental, health and safety matters can be treated separately without blurring the important role of and debate on the United States nuclear deterrent in our national security and general well being.

Our policy is that every reasonable precaution will be taken in the performance of work by Defense Programs organizations and at Defense Programs facilities to protect the health and safety of employees and the public; to protect the environment and prevent property damage or loss of production; and to assure that the lines of responsibility and accountability through all organization elements for environmental, safety, health and quality assurance related matters exist and are clear, direct, and consistent with security requirements.

SAFETY

In doing our task, we must develop and test nuclear weapons through [deleted] underground nuclear explosions. Weapons production as well as development requires that we currently operate four (soon five) nuclear materials production reactors of a size and complexity comparable to commercial nuclear power plants. We must process the radioactive materials and waste generated in those reactors. We must transport and fabricate these radioactive and other more common materials into weapon components. We must avoid criticality conditions in our handling of fissile materials. We must process and fabricate high explosives. We also perform a myriad of more conventional research, development, materials processing and fabrication operations. I submit there are few, if any, other industrial enterprises in this country with a safety challenge equal to ours. Our safety record is commendable and has been achieved with diligence, dedication, and sustained effort, which we will continue.

Our lost time accident and injury rates are one-fourth that of private industrial experience, and our fatality rate is about one-third of our industrial counterparts. In our case, these fatalities are virtually all the result of conventional industrial mishaps, such as construction, electrical, and slip-fall accidents.

Successful as we have been, we cannot keep up the good work without sincere and strong management attention at all levels in our Federal and contractor organizations. We cannot compromise on safety.

The provision of safety, health, and environmental measures is a responsibility of my "Operating Vice Presidents," in the Field Offices and their associated contractors.

As in any industrial organization committed to high quality in its operation, we have sought a better balance in the assignment of accountability for quality control and assurance between those responsible for products and those responsible for oversight. Of course, the Department of Energy's Office of the Assistant Secretary for Policy, Safety, and Environment has Department-wide oversight responsibility for safety matters, except for nuclear weapons safety. However, in order to maintain and improve on our already high safety and quality assurance standards, I have established a new office reporting directly to me to oversee the quality of our Defense Programs industrial, reactor, and nuclear weapon safety; and health and environmental programs across all of Defense Programs. This Office of Security and Quality Assessment also has responsibility for nuclear safeguards and security inspections and evaluations.

SECURITY AND NUCLEAR MATERIAL SAFEGUARDS

The Congress, the administration, and the Department are all committed to enhancing the overall security of our nuclear weapons, nuclear materials, and our critical facilities. Our Defense Programs strategy is to strive to prevent sabotage, intrusion attempts, and nuclear material diversions. While it is not possible to guarantee absolute security, so far, we have been successful in that we have yet to experience such incidents apart from a few nonviolent antinuclear weapon demonstrations. While we are not aware of any specific terrorist group which has targeted any of our facilities, we are not unmindful of world-wide terrorism and the tragedies of Beruit and the bombing of the U.S. Capitol.

I believe that to continue our success, our best approach is one of deterrence. If we are perceived as being well protected, such that anyone motivated to do us harm would understand that his chances of success were small to none, and the risk to his personal safety were very high, it is highly unlikely that he would make the attempt. However, it is not sufficient to just appear to be secure. We also must be secure in the event of some irrational adversary action. To this end our guard forces have been expanded, with vastly improved and more standard training at our new central training academy; modern equipment and other appropriate security upgrades have also been effected, and more are in progress. About nine percent of our budget is devoted to safeguards and security matters.

But, as in any protective system, you need to stress that system to assure it will perform as you expect it to. As part of that emphasis I have reorganized the Safeguards and Security Inspection and Evaluation activities and provided greater organizational independence and visibility.

We have increased the staff devoted to the inspection and evaluation effort and established a schedule of vigorous nuclear material safeguards and security inspections at each major Department of Energy site at least once every 18 months. These inspections address all aspects of the protective system, ranging from documentation of procedures to the conduct of force-on-force exercises. At this time last year, some of our most critical facilities had not achieved the level of security protection that we deem essential. I am pleased to report that this inspection and evaluation program and the management emphasis behind it is already bearing a great deal of fruit in terms major improvements in commitment and performance at all of our sites. We have made substantial progress, and we have more to do.

ENVIRONMENTAL CONCERN

Now, let me shift to the subject of protecting the environment. There is no need to remind you that this is a time of change for us all in the management of hazardous wastes. My concern is that we protect our neighbors, preserve the air and water quality, and otherwise behave responsibly in compliance with environmental laws and regulations. And—we must work at being perceived as complying in a responsible manner. However, public perceptions are not always correct regarding real risks, and the concerns of most actual importance. Since changing to new means of protecting the environment to meet the more stringent requirements of the recent legislation and regulations can be very expensive, we must be sensitive to the real needs of our neighbors and work with them in understanding the appropriate priorities. We are also well aware of the limitations imposed upon us by the taxpayers, and the Congress which provides our authorization and funding. We are seeking to achieve a reasonable balance in addressing environmental needs and accomplishing our mission by discussing and resolving approaches available with government officials at all levels commensurate with the benefits and the costs of the options open to us in solving these problems.

GOOD NEIGHBOR POLICY

We often find instances of bad news with regard to environmental, safety, and security problems. But there is also much good news associated with our community participation which is often ignored and not communicated. I am convinced that we must contribute to the society in general in every way we can and communicate with the public our intent to do so.

We have reemphasized the need in all that we do, to display respect and consideration for our neighbors, and to support local civic activities both at the institutional and individual levels. Through outreach efforts such as these, accomplished with propriety and good taste, we can demonstrate our contributions to the general well-being of the community, including our general economic contribution through wages and taxes and more specific spin-offs as technology transfer to the private sector.

DOE ROLE IN NATIONAL DEFENSE

The Department of Energy's responsibility for research, development, and production of the United States nuclear weapons stems from the Atomic Energy Act of 1954, and has been continued under the DOE Organization Act. The law requires Presidential approval of the weapons to be built, and the annual Nuclear Weapons Stockpile Memorandum, approved by the President, is the mechanism from which we draw our authority for the specifics of our program.

The Nuclear Weapons Stockpile Memorandum is developed jointly by the Department of Defense and the Department of Energy, working through Dr. Wagner, the Assistant to the Secretary of Defense for Atomic Energy, and the Military Liaison Committee. It constitutes production and retirement approval for a 5-year period and planning guidance over the next 10 years.

This chart shows the total number of weapons DOE has provided and is to provide to the DOD each year, spanning the time from 1970 out to 1995. While our total nuclear weapons stockpile is scheduled to gradually increase, the bulk of production is essentially to modernize our weapons as we retire older systems each year. It is this delivery schedule that determines our requirements. We must actually build the weapons required in any given year and at the same time prepare, through research, development, testing, preproduction engineering, and procurement, to accomplish our future build requirements. This includes, of course, not just the weapons themselves, but provision of the contained nuclear materials, management of the radioactive and other wastes, and conduct of our supporting activities. Our materials production supply and demand situation for the next 15 years is shown here. The DOE plant capacity to build the weapons and supply the materials needs over those met from retired weapons has been increased over the last 5 years to match the DOD requirements. The need to continue increasing our plant capacity will be addressed in detail later. Meanwhile, the point I wish to leave with you is that while we can proudly point to meeting a significant workload, we are stretched awfully tight.

INVESTMENT STRATEGY

The Defense Programs investment strategy is a meaningful way to describe the substance of our authorization request for FY 1986.

Production.—I have already discussed the need to manufacture the weapons and produce the nuclear materials required by the Nuclear Weapons Stockpile Memorandum, and to prepare now to meet those needs in the future.

[Deleted.] I believe we have performed reasonably in meeting our production strategy.

Balanced Weapons Research and Development

We must provide our research, development, and testing program with resources to solve near-term problems and to explore the future, not forgetting that we need the brightest people possible. We need to address a broad set of disciplines, allow intellectual freedom, and provide the incentive of challenging work in the best of facilities in order to assure continued technical superiority. Again, in terms of numbers, we have been striving to achieve a base of about 8,500 full-time equivalent laboratory employees and an underground test program of [deleted] tests per year. We have more to do here.

Restoration, Revitalization, and Improved Productivity

The renewed emphasis on maintenance and restoration of our plant facilities and the revitalization and productivity improvements efforts, all begun in just the last 5 years with your support, must be continued. We cannot rest on our laurels and ignore again the need to keep our plant and research facilities up to modern standards, even in the times of somewhat reduced production in our forecast. The materials production program is modernizing operations at Fernald and improving fuel fabrication at Savannah River. Our production reactors are operating at the highest capacity ever. Defense Waste is avoiding the construction of new waste tanks at Savannah River through careful planning and waste concentration efforts. These are just a few examples of steps we are taking to reduce the costs of our work and the results being achieved. We are making good progress in this area. However, restoration—keeping aging plants viable—is a never ending battle. Revitalizing our facilities, particularly our research and development facilities, is key to attracting the best people. In this way we can avoid the dilemma our U.S. colleges and universities are experiencing because of their degraded research and development facilities.

Environmental and Security Responsibility

Whatever the disparate views about nuclear weapons and the facilities required for their production, we must assure and demonstrate to the public that our facilities are operated in a safe, secure, and environmentally acceptable way. We have made progress, but have more to do.

Support Arms Control and Verification

We are charged with the responsibility to develop and produce the technology to monitor foreign nuclear explosions conducted underground, in the atmosphere and in space, and to monitor compliance with nuclear weapons related treaties. Further, we are called upon to provide technical and analytical support as the Department of Energy interagency role in nuclear arms control negotiations and policy formulation. We are increasing the emphasis on this program, and have more to do.

Within our investment strategy there are two issues which deserve additional attention: the Strategic Defense Initiative, and how well we do in managing our business and the costs of nuclear weapons.

While General Withers will cover the Strategic Defense Initiative in detail, I would like to emphasize some of the broader philosophy behind it.

The President has stated that the fundamental reason for this effort is to relieve the world-wide civilization from the specter of the mutually assured destruction which we now face. Since this Strategic Defense approach in the hands of both sides could render all current ICBM forces ineffective and so obsolete, the world could protect national interests by a return to more conventional forces which in turn are possible to defend against.

The Department of Energy's Strategic Defense Initiative related research is carried out in the technology base portion of the weapons research, development and testing program, working toward development of nuclear directed energy weapons concepts. We are pursuing approaches that may apply in the nearer term, to serve as a hedge if nonnuclear concepts are not available when needed to better understand what options may be available to the Soviets, particularly if we operate under different restraints than they might, or in the event of a Soviet ABM breakout.

A second issue that is inherent in our investment strategy centers on how we manage our business. Are we able to keep down the costs of nuclear warheads? What kind of management system do we use to ensure proper coordination between the Department of Defense and ourselves? Are there cost-effective improvements that can be made in our budgeting and management procedures? These questions and a number of others were addressed in the so-called "Starbird Study" some 5 years ago. In the ensuing period, we have made a number of changes to improve our coordination in the development and production of nuclear weapons for the stockpile. We have established a more rigorous discipline of productivity analyses to identify design tradeoffs to minimize costs that will be readily apparent in warhead systems entering or about to enter the stockpile. We have a system for establishing baseline cost estimates and tracking component costs against estimates to enable identification of problem areas and to effect production economies. Thus, we are now able to more clearly examine the unit costs of warheads at each stage in their design, engineering, and production, allowing cost to receive appropriate attention as an important factor in the overall optimization of each weapon system. Many of these improvements we have been able to incorporate in weapons currently in production. But the real improvements will be most apparent in those systems yet to enter production such as the warheads for the M-X Peacekeeper and the Trident II.

We believe that when you look closely at these improvements and the management systems in place, you will see that cost management continues to be a key element in the conduct of Defense Programs.

DEFENSE PROGRAMS BUDGET GROWTH 1981-86

Funding for the Department's Defense Programs has increased substantially over the past 5 years. A moment ago, we looked at charts showing the weapons program build schedule, our "mountain chart," and the nuclear materials supply and demand picture. These graphics certainly show that there has been program growth, necessary to support rebuilding of our nuclear arsenal. However, as the Committee considers our request, we hope it will keep in mind that all of the budget increase cannot be attributed to programmatic increases. This chart shows the estimated costs associated with putting our products out the door. State taxes, safeguards and security upgrades, environmental improvements and the additional other costs to our budget, such as cost of enriched uranium needed for the nuclear Navy, have all increased.

The chart has been prepared in constant FY 1986 dollars so that the effects of inflation are removed. The other factors imposed upon us over the time covered have increased significantly since 1983, leaving $6.1 billion as the approximate cost of our expanded program in FY 1986.

SUMMARY HIGHLIGHTS

The Defense Programs FY 1986 request is for approximately $7.4 billion in authorization and appropriation of about $7.5 billion, which represents an increase in Budget Authority of approximately 9 percent, or about 4 percent after adjusting for inflation. And, as we discussed above, our real program growth is about 2 percent. Our request provides:

Weapons activities.—Production of 8 different types of weapon systems.

Research, development, and testing, with an increase primarily for research on Stratgic Defense Initiative. Inertial Confinement Fusion has been included in the research, development, and testing program and will now concentrate on weapons physics applications. Its actual level will be determined by competition within funding to support weapon development.

Continuation of operational support activities such as restoration, revitalization, environmental and safeguards upgrades.

Materials production.—Near-term production activities, including the first year of L-Reactor operation, increased Purex operations, and continued research and development on Special Isotope Separation.

Funding for enriched uranium, most of which is for the nuclear Navy.

Continuation of the Waste and Byproducts Management operations and construction of the Waste Isolation Pilot Plant and the Defense Waste Processing Facility.

A Security Affairs activities increase for space systems detection activities in support of treaty verification and other related monitoring requirements, and continuation of the Safeguards and Security development effort.

This request, like any budget, is not without some risks. We have, for example, slowed somewhat our efforts to revitalize and modernize our facilities, maintained only minimal flexibility in meeting the demand for nuclear materials, and increased the competition for technology base funding by concentrating Inertial Fusion more specifically on weapons physics applications. Notwithstanding these risks, I am confident we can meet our overall objective.

CONCLUSION

Let me complete my statement with the observation that nuclear weapons' greatest deterrent is in peacetime, and our fervent hope is that they will never be used. Further, if the upcoming arms talks with the Soviets are fruitful and verifiable reductions in our respective strategic nuclear forces are possible, this would be the first step to eliminating the need for any nuclear weapon.

Nonetheless, I also believe that successful negotiations with the Soviets are possible only from a position of strength. I urge the committee's approval of our budget request. It is large enough to support a strong U.S. position in the arms negotiations, yet modest enough to be responsible in light of the budget deficit concerns.

I will be pleased to answer any questions the committee may have.

Mr. **STRATTON**. Thank you, General.

In connection with the comments I made in my opening statement, who or what organization is handling the strategic defense initiative? Is there any overlapping with the nuclear program, the laboratories that are under your control?

Mr. **HOOVER**. Yes, sir. First of all, there is a Strategic Defense Initiative Office that is headed up by Lieutenant General Abrahamson. He basically submits the Department of Defense budget in that area, which I understand will be some $3.7 billion this year. We maintain a continuing liaison and relationship with his office. He has many of his meetings at our facilities, as a matter of fact. So there is a very good integration of what is going on in the total sense.

DEFENSE INITIATIVE PROGRAM

The work of our laboratories is in fact integrated into the total Strategic Defense Initiative Program. In our budget request, we have about $282 million devoted to that. Support of that effort is spread among our various national laboratories.

Mr. STRATTON. So you have only got a very small portion of the $3.7 billion.

Mr. HOOVER. Ours is on top of the $3.7 billion that will be the defense request this year.

Mr. STRATTON. But who is doing the job?

Mr. HOOVER. Lawrence Livermore, Los Alamos, Sandia, basically the national laboratories.

Mr. STRATTON. But the whole argument that has been made for the SDI is that it is a non-nuclear program. We are going to be eliminating nuclear weapons, and so I don't quite get how the nuclear laboratories are going to be developing nonnuclear programs.

Mr. HOOVER. Well, there are two answers to that question. First of all, we have been charged to preserve a nuclear option, because it is not entirely clear whether the non-nuclear concept will become feasible. So we are preserving the nuclear option that ultimately might be useful to us, once we know what the Soviets are doing in this particular area.

Second, since our laboratories are a great national asset, they are doing, in addition to the nuclear work funded through this committee, a lot of work on a reimbursable basis for the Department of Defense in areas of non-nuclear applications.

[Deleted.]

Mr. STRATTON. Mr. Mavroules.

Mr. MAVROULES. Just to follow up on one point, I think it has to be made very, very clear in view of what the President has stated on more than one occasion that this is going to be a non-nuclear system. Although we are going to preserve the option, and I can understand that, somehow I think we are going to need a clearer statement than what has been made. I am sure, I know we are in a secure meeting here today, but somehow for the public, because that could make a great deal of difference on the floor of the House, as you can well understand, Mr. Chairman, we better have a clearer statement on that issue.

Dr. WAGNER. I will have more to say this afternoon on that point.

Mr. STRATTON. I think in view of the joint session, perhaps we should adjourn until 2 o'clock. Then we will resume our hearing in this room. Thank you very much.

[Whereupon, at 11 a.m., the subcommittee recessed, to reconvene at 2 p.m., the same day.]

AFTERNOON SESSION

Mr. STRATTON. The subcommittee will come to order and we will continue to be in closed session pursuant to the authority granted earlier.

Our second witness will be Dr. Richard Wagner, chairman of the Military Liaison Committee to the Department of Energy and Assistant to the Secretary of Defense for Atomic Energy.

Dr. Wagner, we are delighted to welcome you here once again.

STATEMENT OF RICHARD L. WAGNER, JR., CHAIRMAN, MILITARY LIAISON COMMITTEE TO THE DEPARTMENT OF ENERGY, AND ASSISTANT TO THE SECRETARY OF DEFENSE FOR ATOMIC ENERGY

Dr. **Wagner**. I would like, if I may, to do what General Hoover did this morning which is submit a formal statement for the record. In order to save time, I would like to parapharase it myself by talking through a few points and showing a few viewgraphs.

Mr. **Stratton**. Without objection, that will be ordered and your remarks will be included in the official record. You may proceed.

Dr. **Wagner**. Thank you, sir.

MILITARY LIAISON COMMITTEE MEMBERS

Let me first introduce the three members of the six Military Liaison Committee members who are with me today representing each of the services: Brig. Gen. Sidney Davis is on my left. Maj. Gen. Alexander K. Davidson is on my right, and on the far right, Commodore Roger F. Bacon, who will make brief statements about the particular programs in each of their services that are in the DOE budget.

I would like to start also by adding DOD's acknowledgement to what General Hoover said this morning about the tremendous debt we all owe to Mr. Price. I think if I were to say any more than that, it would perhaps even detract from the point because I couldn't describe the debt that we owe him. He really was one of the great people in this important program, and I think we will never be able to repay him.

GENERAL TALKING POINTS

I would like to go through some rather general points today, if I may, talking about, from our perspective, some of the things that are right with the weapon program, then some concerns we have.

I will be brief about the things that I believe are right, because you know many of them, and that is not really the point of the discussion. But they are significant. It is clear from the point of view of DOD that the nuclear weapons program is simply delivering superbly designed, superbly produced nuclear weapons for the Nation's stockpile.

General Hoover this morning showed you the [deleted] in production from the [deleted] this coming year. I think that has been a real accomplishment. They have not sacrificed quality in the process.

Another important strength, one that doesn't show up in hearings that are aimed mainly at budget issues is that the Department of Energy, largely through the laboratories, but not exclusively, provides very valuable independent judgment on the Nation's nuclear weapons program to complement the judgments of the Department of Defense.

We often think that that complementary judgment is confined to issues of safety and security, but that simply isn't so. Those complementary judgments extend across the whole range of issues of nuclear deterrence and not only are those judgments complementary and competent, I might add, but they also provide an element of continuity which is something that I think the Department of Defense is somewhat deficient in.

There are pockets of continuity in the nuclear programs in the services and Department of Defense and OSD, but they are just that, they are isolated pockets. A tremendous amount of the institutional memory, the persistance in programs from one year to the next and sometimes from one decade to the next, comes from the DOE programs and from nuclear weapons program.

I think that the Nation has to draw on that continuity and independence more heavily than it has so far. In a word, I guess my feeling is that the strength of the program can be summed up in one word, which is quality.

They are providing tremendous quality in both the hardware product and the intellectual product to the Nation. The concerns I have really fall into two main categories. One is the level of effort in the research, development and testing program, which I believe may not be adequate for the future needs at today's level. The second is the slow progress that we have been making, as Mrs. Holt mentioned this morning, toward having what I would describe as the necessary resilient and flexible posture [deleted].

[Deleted.] To go into a little more detail on the research and development, there are three things that we look to the research and development program for. The first is continuation of the lines of design that have found expression in the current stockpile. The kinds of warheads that are in the Pershing II, and artillery shells that we will talk more about later.

In the Navy warheads, in the antisubmarine area, what I might call the classical design technology in the nuclear weapons program, the Department of Defense will need even more quality and quantity of that kind of design in the future for reasons that I will elaborate on.

The second area is on the Strategic Defense Initiative.

Mr. Chairman, I will come back and try to clear up some of the points you and Mr. Mavroules raised this morning on that. Then the third area is one we don't hear too much about. It is under the heading of avoiding technological surprise because of the [deleted] in the Soviet weapons program, the corresponding program in the Soviet Union.

Let me talk about those in that order. The things we will need to carry on into the nuclear weapons stockpile developments in the nineties and into the next century exclusive of the SDI, which I will come back to.

SOVIET STRENGTHS

In the strategic arena, the Soviets are in some sense doing what some of us call [deleted].

[Deleted.] This will mean a thrust on the warhead side of different kinds of things than we have had in the strategic force before.

Generally, in the strategic forces heretofore, we have had warheads which were in reentry vehicles or bombs, the [deleted] but we found we could meet them. To meet this new challenge, the Soviets have shown us the last decade, and show every sign of continuing, we are going to need [deleted].

The other side of the strategic coin is the survivability of our own forces. Over the long run, I suspect we will see the need to provide some degree of mobility for our own ICBM force. The forerunner of that will be perhaps in the small ICBM development suggested by the Scowcroft Commission.

My belief is that the logical extension of the quest for ICBM survivability by mobility will put an unprecedented importance on building into the strategic war heads the same kinds of [deleted] and for the same reasons. [Deleted.] But it will be much harder to provide those features [deleted].

So in the strategic arena out in the nineties, the research and development program is going to have to produce a lot more than I believe it has in the past.

In the tactical arena, especially in NATO which I know, Mr. Chairman, you have a particular interest in, as you know, I think better than I, the political constraints of NATO have made it difficult for us to carry out the kind of modernization program that we in the technical area have felt so strongly the need for. I believe that is a fact of life. I have come to be reconciled to some extent to that myself in the last 4 years.

I think it makes it even more important for us to do quickly those things that we can do, in particular, things which have been mandated by the *Montebello* decision of about 18 months ago which would reduce the numbers, but very clearly reduce them because we can put in place modernized systems.

The first of those beyond the Pershing and GLCM, which are now going into the field, will be the artillery shells. I believe General Davis will talk more about the artillery shells.

RESPONSE TO MRS. HOLT

Let me simply respond briefly to some of the points Mrs. Holt raised this morning.

In the Secretary of Defense's letter to Mr. Aspin and to Senator Goldwater, he did say, if I can find it here, though, that 925 modernized nuclear artillery projectiles, no matter what the mixture, [deleted] will have to wait for another 5 weeks until we see SACEUR's report on how he would propose to accommodate the Montebello reductions.

However, I am quite certain, and this is not to try to preempt his numbers in detail, but I am quite certain that it will require [deleted]. That would result in [deleted] but better than if we had none of the W-79 and none of the W-82 in production.

It will also have, and this is also a point Mrs. Holt may have been [deleted].

The other important part of the theater modernization program beyond the weapons systems themselves, will be to provide for the survivability of those systems which are in the field. If you have fewer, it is particularly important that they be able to survive. That is an important element of their deterrent contribution. If the enemy can destroy them in the early stages of a campaign, particularly if he can destroy them with conventional weapons, which seems to be a capability that he is striving for, the deterrent value of those weapons is greatly reduced.

In fact, they become a tempting target rather than a deterrent.

We are making, I think, substantial progress in providing for improved survivability for those weapons. And the Department of Energy has a large part to contribute in that effort as well, both in building the safety and security features in the weapons which you are aware of which has been going on for some time, and which allows the weapons to be removed while maintaining control and security over them in a crisis, but also by developing techniques for hardening the storage sites, dispersing the strategic sites, which will allow the effectiveness of an enemy attack on the storage location to be reduced substantially.

Mr. STRATTON. Doctor, let me interrupt you here.

Dr. WAGNER. All right.

Mr. STRATTON. I have a feeling we have gone through a lot of this stuff and we are perhaps aware of some of the numbers and some of the designations. But we are facing in this Congress a very crucial political decision in the next 2 or 3 or 4 weeks with respect to the MX, and I think the kind of information that you are giving us, I don't find that it is particularly applicable to the political problems that we are going to have to solve.

If the House and Senate do not support the MX, we might as well call off the negotiations in Geneva because the Soviets will realize they don't have to negotiate anything.

Let me ask you a few things that from time to time pop up, and I think many of us who are supposed to be knowledgeable in this field find it a little bit hard to respond to. For example, Secretary McNamara has been going around lately talking about, if I recall, that we have 50,000 nuclear weapons, and even if we reduced them by half, we would still have 20,000, and that would be enough to blow up the world, and, therefore, we should follow the recommendations that he and Mr. Kennon and Mr. Bundy have been making.

Do we have 50,000 weapons, and if so, why do we need 50,000 weapons? Does the Soviet Union have 50,000 weapons, or 80,000 weapons?

STOCKPILE INVENTORY

Dr. WAGNER. Mr. Chairman, the number in our stockpile is, as you know, classified, but it is——

Mr. STRATTON. Well, we are in classified session. If we can't get classified information in classified session, I don't know where we can get it.

Dr. WAGNER. I say that because, not because we are not in classified session, but because so many of these numbers have been talked about as if they were unclassified in the press and elsewhere. I just feel constrained to preface any comments about the numbers in the stockpile that way, almost every time I discuss them.

We have [deleted] weapons in our stockpile today. That is a number we know well. [Deleted.]

Mr. STRATTON. We have [deleted] and they have got [deleted] you say?

Dr. WAGNER. [Deleted.]

Mr. STRATTON. Now, what are we doing? You are counting in all of the tactical weapons, many of which have been removed from Europe. Presumably you are counting in the Minuteman II's and the Minuteman III's. What are we doing with them? Are we just leaving them in there to cook? Is a silo kind of like a refrigerator, so that nothing is happening there, that they are immediately ready to go in the event that we should need them?

I mean, it seems when you buy a car, you don't drive it forever. You get a new one.

Dr. WAGNER. That is right.

Mr. STRATTON. But it looks in this particular field that we are keeping all of the old cars in the backyard, and getting ready to drive a Cadillac. I am wondering, my understanding is that we are—I think you indicated or General Hoover indicated that we were getting [deleted]. And I understand from the Uranium Council that we are getting a [deleted]. And could you give us some indication, because obviously we need to build up the MX to try to match what the Soviets have, but do we have to keep producing the warheads for all of these other missiles that are in silos in various parts of the country?

Dr. WAGNER. For the warheads on Minutemen II and III, the production there has been completed. We are not producing warheads for those. The most recent modernization there is the Mark 12-A for the Minuteman III. Those systems are aging. We are not producing replacement warheads for them.

Mr. STRATTON. But we are counting on them as part of our deterrent, are we not?

Dr. WAGNER. Yes, sir; indeed we are. And the older they get and the more the Soviets modernize their own systems, the more of a disparity there will be. We are counting very much, therefore, on the MX as a step in the direction of turning around and beginning to modernize our ICBM force again.

Coming along beyond that in the early nineties will be the small ICBM, which will be another significant modernization, but we are still going to have an ICBM force which is aging and old.

Mr. STRATTON. Do we need the Minuteman II's?

Dr. WAGNER. Yes, sir; I think we do. You asked why do we need so many. It is largely because our fundamental posture is one of being able to absorb a Soviet initial strike and respond with a retaliatory second strike which, by its magnitude, would deter the first strike to begin with. That means we have to be prepared to have a great many of our own weapons destroyed by an effective Soviet first strike and still have enough left to retaliate. The amount, the fraction that we think would survive varies from system to system, but that is the basic problem that drives the numbers up.

The same thing is true with all three of the legs of the triad, although the submarine force, as you know, that fraction which is at sea, is, we believe, quite survivable.

So that is one initial multiplier, if you will, for the numbers. The second——

Mr. STRATTON. But you say that it is not secret, that is why we built the MX, that the Soviets had the capability of wiping out all of our land-based missiles, and if we were to respond with submarine-launched missiles, they still have enough to wipe out anything that is left. And that is presumably why we need the MX.

It is no longer fashionable to talk about the window of vulnerability, but that window of vulnerability has been open for a long time. As a matter of fact, this subcommittee was the one that developed this specific bit of information from unclassified sources that were included in the Congressional Record. And Secretary Brown said this was a lot of nonsense. We didn't know what we were talking about, and it turned out that we took a look at the figures, found out it was true.

It seems to me that if we are going to spend a lot of time on these warheads that are vulnerable to the Soviet strike, we are wasting time when we need something that is much more potent.

Dr. **Wagner**. We certainly need the MX. By virtue of the larger number of warheads on the MX, even after absorbing a strike, there will be a larger remaining number of warheads to retaliate. That prospect will deter the Soviets.

Mr. **Stratton**. Let me ask another question. What input do you give to the arms controllers? You are talking about some agreement here that I am not familiar with where we decided to reduce our numbers. And I assume that you are talking about the tactical weapons in NATO that we pulled out [deleted] of them. But what about, what does the Department of Defense contribute to the arms control agreements if we are going to propose that the Soviets give up their SS-18's and SS-19's?

Does the Department of Defense make any recommendations of what we can afford to give up in return?

ARMS CONTROL AGREEMENT

Dr. **Wagner**. Yes, sir, we certainly do. We provide analyses of just exactly the kind you are talking about for the arms control community. We play a strong part in developing the positions that will be explored at Geneva next month.

Mr. **Stratton**. What is the Defense Department doing about getting the information across to the Members of the House and Senate with respect to the urgency of a positive vote on the MX?

Dr. **Wagner**. Mr. Chairman, I am not aware of everything we are doing in that area. I believe, however, that we are at a large number of hearings making, I trust, many of the same points that you are making about the urgency of the MX development. I know that we have a quite active campaign to talk to Members about the importance of those programs.

Mr. **Stratton**. We have high-ranking members in this committee who say that building the MX is just a waste of money. If this is as important as you indicate, it seems to me that you need to really have a crash course in the importance of this weapon, because I can't see anything that could be more disastrous to us than the present arrangement, than to have the MX vote go down. And for them to say, "Well, OK, we have lost the MX, we will go out and build 900 Midgetmen and put them all around the country." I think this is going to be a major watershed, and I don't get the feeling that the administration is really recognizing how serious it is going to be.

The Senate is in revolt on the budget, and the House is certainly going to be in revolt, and you can't just assume that because there are more Republicans in one place than Democrats that this thing is going to prevail. I am a little worried about that, and to sit here and talk about how many more warheads we need makes me shudder, because I don't think we are focusing on what is the most immediate question.

COMMITMENT TO THE MX

Dr. WAGNER. Mr. Chairman, let me respond to that in two ways. I know that the Secretary feels a very strong commitment to the MX. I know that he is putting a lot of his own personal time on that issue. I know that the Air Force—in just a minute, perhaps, I will ask General Davidson to respond to some of your points—I know that the Air Force feels the same way.

I think what you are telling us is that we are not getting the message across.

Mr. STRATTON. Sure aren't.

Dr. WAGNER. From the point of view of this committee or anywhere else on the Hill, we can certainly put together the argument for the MX and for strategic modernization in general, and come over and talk to whoever you think would be useful, in particular, this committee.

Mr. SKELTON. Mr. Chairman.

Mr. STRATTON. Yes.

Mr. SKELTON. If the gentleman would yield at this point, I can't help but agree with what you say exactly. To clarify it a step further, Doctor, you are not getting to the American people. That is more important than trying to sell the numbers to Congress.

Dr. WAGNER. Well, that is a concern, and we are concerned about it. All I can do today is offer to come back to you with that story.

Let me make a point, however. It is certainly true that the MX vote is an important one, that the MX is an important system. However, the history of the past half dozen years in this particular program, the DOE Weapons Program, has been one, I believe, where because of a need to modernize the forces, not just the MX, but many of the other things we have been doing, we have been looking at the next couple of years. The point I was driving toward was that we have been looking at the next couple of years, to some extent at the expense of the research and development base of this program which has been its strength for 40 years. It is healthy in the sense of the amount of effort that is available to pursue it.

Today's R&D base is essential so that the MX requirement, whatever it turns out to be, it wouldn't be called that in the nineties, can have a good warhead available for it. That was the line I am going down. I realize that I have not made the point that you want. Let me simply volunteer, then, to come back, if we may, with a fuller discussion on the MX than I believe we are prepared to offer today.

May I do that? Is that acceptable?

Mr. STRATTON. Well, I think we certainly need every bit of persuasive evidence that we can get.

Dr. WAGNER. We could do it——

Mr. STRATTON. The big argument, of course, you are talking about hardening a moment ago, a distinguished Senator such as Senator Moynihan, for example, has taken the trouble to write a book about the MX because it is vulnerable and can't be defended, that it is going to actually be an inciter to attack simply because of its vulnerability. I don't think even the Scowcroft Commission has been able to make any response to that kind of charge. I think it is a false charge, but I don't see any real effort to shoot it down. And you go around and talk to people about the MX. They are not too excited about it, because as Mr. Skelton has indicated, that they don't understand what is happening here.

This, I think, is what is very likely to precipitate a disaster, a major disaster if the Congress of the United States doesn't even want to build one hard target missile when the Soviet Union has got 800 in their stockpile according to the President.

Dr. WAGNER. I think, sir, that the Scowcroft Committee did comment on the MX basing in two ways. One was that to observe that the MX was not the answer forever. That one would need to follow along with the small ICBM in a less vulnerable mode, in some new mode, but that the MX did fill a gap between its IOC next year, and some years out into the nineties that was a crucial gap to have filled.

It is more survivable than the Minuteman, and those that do survive pose a retaliatory threat which is more potent than the Minuteman. That, in fact, I think, is not destabilizing, but stabilizing. I am not sure how else to make the argument.

Do you want to comment on the MX?

General DAVIDSON. I am not prepared to make a formal presentation on the MX, Mr. Chairman, but I can say with absolute certainty that it is the number one priority within the Air Force's Strategic Modernization Program, and we are pushing very hard for it. That goes right up to the top of the Air Force——

Mr. STRATTON. What do we read in the newspaper? We don't read about the MX. We don't read about how survivable it is. We follow with rapt attention whether a general in the last war that we fought codified the right number of soldiers. And this has been all over the New York Times and the Washington Post for months, and a big splurge in the last couple of days.

Mrs. HOLT. Will the gentleman yield?

Mr. STRATTON. Sure.

Mrs. HOLT. Well, I have to disagree with the gentleman from Missouri. I don't think it is the witness' responsibility to go out and convince the public. I think that is the job of the Representatives. We represent districts. We are the people who are supposed to take the story back and tell it. I think your job is to convince us and to give us the information that is going to convince us that it is an absolute necessity.

I think there is a lot of doubt, a lot of the stalwarts are beginning to weaken because Senator Moynihan, is going out and doing his job. He is trying to tell his story. So I think it is very important that you give us as much ammunition as you can to try to defend the system.

What would happen if we didn't do it? What would be the vulnerability if we let ourselves let that leg of the Triad go down the drain until ~~the late ni~~neties? What would happen then? Anybody.

General Davidson. I will back up what Dr. Wagner just said about an offer to provide additional information in a presentation. We have never refused such a request and we will certainly be glad to accommodate you with any type of presentation on the MX program that you would like to see.

Mrs. Holt. In Dr. Wagner's secret statement, he says [deleted].

Dr. Wagner. The Defense Nuclear Agency, with input from DOE, is looking into silo hardening. The important thing is that it appears today as if it might be possible to harden silos far beyond what we though a few years ago.

Mrs. Holt. Harden them to the extent that the weapon would still be effective?

Dr. Wagner. Yes. [Deleted.]

Mrs. Holt. Well, I have been sold on it because as the Scowcroft Commission people said, the synergism is there. We are looking at the three legs of the triad, that we are keeping them off base on this particular ground system, and I hope I am not going to be completely shot down, because I believe in that. I think that is the right way to go and I think that is where we should be concentrating more. The more ways we can keep them off base and occupy their research and development, the better off we are.

Dr. Wagner. I agree with you completely. Having all three legs of the triad is very important both in a technical sense, that it poses to the person who is trying to design the attack a difficult technical problem of synchronizing his attack, and also in the sense that that is a system which is on U.S. soil. It has a kind of a special political character to it because of that.

Finally, and Mr. Stratton made this point earlier, it is the component of the ICBM force that will be able to attack most effectively [deleted] in retaliation, and most of the targets we would need to retaliate against in order to have have an effective deterrent force would be [deleted].

As I said, they have had for many years—we are just beginning to see the scope of it—a very extensive program to [deleted]. So the MX has those values as well.

I think it would be better for us, however, to come back to you. In fact, we could do it during this set of hearings if the DOE people and you wish it, or we could do it at another time, with a good, concise story on the MX.

Mr. Stratton. I don't want to take up all your time here. Let me ask one other question. Are we perhaps diluting the support that might go to the MX by placing once again the most dramatic emphasis on the SDI? The SDI, whether it works or not, is obviously not going to be available by March 15. And it isn't going to be available probably for a number of years down the road. And yet we are focusing all of our attention on that. And it's almost as though people have forgotten that the MX had been put in the fence, and nothing was going to happen about it.

Dr. Wagner. Mr. Chairman, I believe we have to do both.

Mr. STRATTON. Well, I do, too. But I mean, we aren't going to have SDI available within 5 or 10 years, are we? Whereas the MX is today's weapon.

STRATEGIC DEFENSE INITIATIVE

Dr. WAGNER. But I believe that everything you say is true. However, I think it is imperative for us to start to move the balance toward one that is in a sense more in balance with some defense capability.

Mr. STRATTON. I agree. We ought to work for the future. But take a look. Mrs. Thatcher didn't talk about the MX, she talked about the SDI. That's the thing that caught her eye. She finally agreed that this was a good thing. But it isn't what we actually need to get in the direction where we should be going.

Mrs. HOLT. Will the gentleman yield?

Mr. STRATTON. Sure.

Mrs. HOLT. It seems to me that that's always the problem in our defense industry, is that we have got to do the research for the future years. And you have got to have the dollars to do the research. And the only way you do that is to talk about it. Certainly the SDI has gotten the attention of the Soviets. But in the meantime you have to do the things, it seems to me, that during the 12 years I have served on this committee, we have always talked about something that is way out into the future as if we have got it in hand today. That is one of the problems we are faced with in trying to find the funds to do those things, but we still have to do it.

We let our research go too far down the road already.

Mr. STRATTON. Mrs. Byron.

Mrs. BYRON. Yes, let me bring up a point that concerns me. That is, we are beginning to find a new mechanism within this body of funding, and that is fencing funds. We saw last year two different programs, the MX and then also the test phase on the ASAT which were both fenced. Is that going to be a way of life we are going to operate in, because if we are we have really got problems down the road because we are not really authorizing. But I am not sure that is not a sham on the American public, when everybody agrees that we need a system. Then we fence it and say we will worry about it later on.

Could you give me a little bit of your feeling on fencing funds and on what that does to your programs and your development stage?

Dr. WAGNER. It's much harder to manage with the inflexibility that is imposed with fenced funds. However, it is better to have fenced funds than no funds. That is often the situation we are placed in. I don't know how to answer you other than that.

Mrs. BYRON. Can you operate with fenced funds?

Dr. WAGNER. Of course, but it's much harder to run a program, especially a development program which is out at the edge of technology, as almost everything we try to do is, when you lack the flexibility that you need; and you lose the flexibility with the kind of fencing that occurs.

Mrs. BYRON. But you feel it's better to have the funds fenced?

Dr. **Wagner**. I think it's better to have funds even fenced, than no funds for some programs. I can only carry that point to a certain extent. If it got to the point where all of our major developments were fenced, were tightly constrained with one condition and another placed on them, I think we wouldn't be able to operate.

I think it hasn't gotten to that point yet.

Mrs. **Byron**. I see this as the way of life coming down the road because I can think of three or four currently fenced——

Dr. **Wagner**. I think the trend is very worrisome. I agree. Mr. Chairman, could I——

Mr. **Stratton**. Go ahead.

Dr. **Wagner**. Well, I thank you for the interruption because it is clear that we have missed a point that you have felt very important and we feel important too. It is not as directly pertinent to the DOE program, however, because the MX issue is considerably broader than just the DOE program. That is really why we are not as prepared as we maybe should have been to discuss it.

LONG-TERM R&D EFFORT NEEDED

Let me go on very quickly and simply summarize what I was trying to say by saying that we are going to need a larger long-term research and development effort in this program than we have today to meet both current needs for things like the remainder of the development on the MX, but the next decadé's developments as well. One of the things that is stressing the research and development program, as we see it in DOD, is also the SDI Program. Let me take this opportunity to comment on a few points that were made this morning.

Mr. Mavroules in particular made the point that the Department of Defense and the President have been saying that the SDI is aimed toward a nonnuclear capability. Let me clarify that. In fact, let me read a few paragraphs for you which we put together, that I think capture how we see the nuclear component of the SDI.

The SDI is a program of vigorous research focused on advanced defensive technologies with the aim of finding ways to provide a better basis for deterring aggression, strengthening stability, and increasing the security of the United States and our allies. As a broad research program, the SDI is not based on any single or preconceived notion of what an effective defense system would look like, but the long-term goal of the research program is a truly effective nonnuclear defense.

There are, however, some new concepts which could, if proven feasible, convert nuclear energy in a carefully directed, controlled way so as to destroy attacking missiles, after they are launched, at a great distance. Unlike the thinking of the past, these new concepts would not use the effects close to the explosion of nuclear weapons to destroy the attacking missile, and they would be controlled so that there would be no harmful effects from the nuclear source. There are a variety of reasons for including research on such concepts at this time:

One, to determine the feasibility and effectiveness of counterdefensive nuclear-driven systems that an adversary may develop for use against future U.S. surveillance and defensive systems.

Two, to understand the technical feasibility and impact that such concepts might have on our deterrent forces if utilized in Soviet defensive systems.

Three, to explore nuclear directed energy options as SDI possibilities if needed.

NUCLEAR SDI OPTION

Dr. WAGNER [continuing]. Let me go back to the thought that a new kind of a nuclear-driven defensive weapon is in fact very much in the DOD's thinking as one of the options we would like to develop for the SDI. The distinction, however, is that it is not like the old kind of nuclear weapons that were in defensive systems we were talking about a decade or two decades ago where the weapon has to get very close to the target, to the incoming missile, to destroy it. These nuclear power sources, if you want to consider them that way, they are explosions but they act as power sources, powering apparatus around the device that produces an effect at a great distance which may be of tremendous advantage to a defense. That kind of a nuclear component to the SDI array of options is endorsed by the department of Defense.

The long-term objective would be to be able to do without even that as a nuclear component because I think the President truly has—by long term I am sure he means many decades—truly has an objective of eliminating nuclear weapons from this defense-dominated world that he is committed to. But the first stages of the SDI Program, which as you say may last decades, I believe, and the Department believes, will have this nuclear component, this new kind of nuclear-driven directed energy weapon as one of its very important options.

Mr. STRATTON. But this is not a nuclear explosion, it's just nuclear energy, right?

Dr. WAGNER. It's a nuclear explosion. Not all of them might be nuclear explosions. Some of the laboratories have ideas about other kinds of nuclear-powered things. But many of them would be nuclear explosions. They are different from the kinds of nuclear weapons that we have had for defensive systems before because they don't depend on the sort of immediate nearby effect to kill the incoming missile or warhead. They direct the energy at a great distance which is much more effective. Because they can do that, because they are more effective in directing the energy, you could perhaps use many fewer such explosions than in the classical ballistic missile defense schemes of the past. There would be no question about harm to people on the ground, harming your own country and substantially reduced perturbation in the defensive system itself because of the nuclear explosions.

I think it really is fair to think of them as qualitatively different from the kinds of nuclear weapons we have had in defense option, strategic defense options in the past.

Mr. STRATTON. We spent a good deal of time trying to explain the SDI to our European colleagues. I tried to make that point that they were not nuclear. And my understanding of what the theory was, was that when in the boost phase you saw a rocket coming out of the Soviet Union, you would then have one of your little Sprint missiles that is contained in the satellite overhead, and that would be a strictly more or less just like a Harpoon which would then break up the nuclear missile. That was what I thought was involved, that you simply broke up the missile with its nuclear warhead and it would drop down on the ocean or over the Soviet Union or wherever it was fired from.

Dr. WAGNER. As you know, the ultimate idea for the SDI would be a multilayered defense, where some of the intercepts would occur shortly after the Soviet Union launched its missiles, perhaps just outside the atmosphere over the Soviet Union, with another layer up high, close to the peak of the trajectory, and then perhaps another layer down closer to catch the ones that leaked through. The ultimate objective in the "long term" would be to be able to do that job at each of those several layers in something like a variant of the nonnuclear system you just described. It would be different perhaps for each one. There is a lot of creativity being applied.

In the near term, however, those approaches are very hard to do. Those are the ones that may take a number of decades to put together, I believe, to integrate into a fully effective defensive system, if we can do it at all. And I think it is by no means assured that it could be done. But I think many of us who have been involved in this feel the prospects are good enough it is very much worth the investment we are asking you to support us with. But in the near term—by that I mean a decade or two, not three or four or five—the effectiveness that would come from these new kinds of nuclear driven long-range effective systems is something we ought not to give up.

The Department of Defense does not want to give up that possible option.

Mrs. HOLT. Why are the Soviets so nervous about it? They are doing research in it. With the long-term thinking we are doing on it, the difficulty we are having really coming up with anything concrete, why are they so nervous?

Dr. WAGNER. I don't think we know why they are nervous about it.

Mrs. HOLT. Would that make you think they were farther along than we are?

Dr. WAGNER. I think that there has been an attempt on the part of the Soviets for 15 years now to slow down the United States research on defensive systems [deleted].

Their nervousness may in fact be an extension of what I personally believe has been a campaign carried out in a lot of different ways to slow that kind of research down on our part. [Deleted.]

Let me put on one Vu-Graph to show the way the funding is carried between the Department of Defense and Department of Energy on the SDI. I think there may have been a little confusion on this point this morning.

FY 86 SDI FUNDING

	TARGET DESTRUCTION		SENSORs COMPUTERS & SUPPORT	TOTAL
	NUCLEAR POWERED	NON-NUCLEAR		
DOD FUNDED	20	1800 (60-100)*	1880	3700
DOE FUNDED	280	0	SMALL	280
TOTAL	2100		1880	3980

* AT DOE LABORATORIES

69(1)

Let me point to the Vu-Graph. This line is the total DOD funding for a total in 1986 of the $3.7 billion that is in our budget. This line is the DOE funding, the $280 million or so General Hoover mentioned this morning. The way that is split out is the following. If I think of the SDI technology as being broken into basically two different parts, the mechanisms by which the target is destroyed, and all of the other things that go along, the sensors, infrared viewers, the computers, the ground-based equipment, and so forth, in those two categories, you will see that the DOD program is roughly split evenly between those two things. The mechanisms that will directly destroy the target, about $1.8 billion and about $1.9 billion in the everything else.

The DOE, however, concentrates almost entirely in this category of target destruction and it is in this new kind of nuclear driven, directed energy device, where that $280 million lies. So that DOE funding at $280 million is exclusively for the nuclear related research of this part. The Department of Defense, for nonnuclear target destruction mechanisms, funds totally the various places around the country, contractors and DOD labs, at the $1.8 billion level. Of that $1.8 billion, certainly $60 million, perhaps as much as $100 million in the 1986 budget, will go to the DOE laboratories for research on the nonnuclear components.

So it is that distinction between that DOD-funded reimbursable program at the laboratories on the nonnuclear part, and the roughly $280 million that DOE funds as its share in this partnership, which is what General Hoover talked about. That is almost exclusively for this sort of new kind of nuclear driven weapon that we have been talking about.

Mr. STRATTON. Mr. Mavroules.

Mr. MAVROULES. I wonder if I could impose upon you, Mr. Chairman and my colleagues, to have Mr. Wagner, because I asked the question this morning, Mr. Wagner, repeat that one paragraph so we may clear the air, on something which I consider extremely important. More important for you, I believe, than it is for us at this point to clear the air as to where we are going. Then let me ask the followup question, which has to do with this. Can you tell us today, maybe 15 years down the road, what your projection is? And this will be a nonnuclear device as the President has so stated? You see, we are going to have to vote on it. Then we have to take it to the floor. We cannot have conflicting reports on it. So I think the better we clear the air on it now at the beginning, the better off we are all going to be down at the end.

I wonder if you could read that one paragraph again.

SDI NONNUCLEAR CONCEPT

Dr. **Wagner**. Yes. Let me preface reading it by saying that I can't be certain that the distinction implicit in the paragraph I am about to read is also in the President's mind. I think it is. I know that it is in our own thinking in the Department of Defense, including the Secretary. Let me make the distinction by reading the paragraph again. I will go back to say the SDI is a research program; the long-term goal of the research program is truly effective nonnuclear defense. From a technical point of view as opposed to a policy point of view, I think that means [deleted]. That is my personal technical opinion.

Some components may be nonnuclear and the research is truly nonnuclear. But fully nonnuclear, I think personally not [deleted] from now. Then the distinction about different kinds of nuclear concepts is in this paragraph.

There are, however, some new concepts, namely nuclear concepts, new concepts which could, if proven feasible, convert nuclear energy in a carefully directed, controlled way so as to destroy attacking missiles after they are launched, at a great distance. Unlike the thinking of the past, these new concepts would not use the effects close to the explosion of nuclear weapons to destroy the attacking missile and they would be controlled so that there would be no harmful effects from the nuclear source. Then it goes on to say that there are a variety of reasons for doing this, but they fall into two categories: to understand what the Soviets could do, and to see if we want to do it ourselves.

Now let me put a little more amplification on the distinction. I think it is legitimate to consider this category of thing, these new concepts, as being really qualitatively different from the way nuclear weapons were thought of as part of defensive systems in the past. In the past we relied on what I would call a brute force approach. You get a nuclear weapon pretty close, [deleted] and you explode the nuclear weapon and it produces all kinds of horrendous effects on the target. That means you have to use an awful lot of them.

This new idea is different because it focuses energy on the target in a direct way. I think you have seen those described in the past.

[Deleted.]

I think in a sense those distinctions, actions at a distance and the many fewer, are matters of degree. But I think there is such a large difference in degree that they constitute a qualitative difference.

That qualitative difference is the thing that I think has required some amplification. I know what the Department of Defense means by not wanting nuclear weapons in the near term is the old kind of nuclear weapons. But as a very thoroughly adopted part of SDI, we see immediate research requirements for nuclear-driven directed energy concepts. In the very long-term sense, I think the President and the DOD would like to have the defense be even without these new types. Does that help?

Mr. MAVROULES. It helps. It's a little confusing. It helps, of course it helps, but trying to explain that to 435 colleagues is going to be very difficult.

Mrs. HOLT. Just say it's nonnuclear.

Mr. MAVROULES. We also have to be honest with ourselves and I appreciate your candor, by the way, very much. We have been honest with ourselves. Give the full information because we have to fight this on the floor, as you well know, Mr. Chairman.

Mr. STRATTON. Well, could I ask, is this kind of nuclear explosion, as we talked about it, is this something that would not have any fallout and wouldn't contribute to the nuclear, so-called nuclear winter that many of our colleagues are trying to fight this with?

Dr. WAGNER. Most of the ideas, and you have to realize that we are just beginning to think about these, these kinds of explosions could occur at very high altitudes. There would be some radioactivity produced. I think it wouldn't manifest itself in a fallout in the sense we think of explosions close to the surface, and it would not start any fires on the surface of the Earth, so it wouldn't contribute to whatever one means by nuclear winter.

Mrs. LLOYD. I am always a bit confused because I think it undermines some of the arguments of many of the SDI proponents that are stressing the rationality of a defensive space and a ground-based nonnuclear program.

Dr. WAGNER. Let me say that in several senses the SDI will have to be a phased program.

Mrs. LLOYD. It is a three-tier program. We have been stressing the ground-based power system as nonnuclear.

Dr. WAGNER. There are many ideas that are nonnuclear and the emphasis on SDI is on nonnuclear research. My point here is that that DOD is eager to accept the research in these new types of nuclear-driven defensive systems even though they are nuclear. It pains me a bit to say "even though." Because even though we would like to ultimately have a nonnuclear, fully nonnuclear SDI, because of the tremendous energy available with these nuclear-driven devices, they may be feasible [deleted] and in order to get to that objective in the long term of a fully nonnuclear SDI you have to get to some SDI to begin with. It may be more effective to get there by using this new kind of nuclear power.

Mrs. LLOYD. The point I was trying to make, if we start out in that direction you are never going to be able to convince the American people, we are going to start out this way but we are coming back to the nonnuclear ground power station. I think the biggest problem with trying to sell the realities to the American people is that they don't believe us.

Dr. WAGNER. Well——

Mrs. LLOYD. We don't have a great deal of credibility there. I don't think that that is going to add to the credibility, and I would much rather see us do what we can do.

Another thing I really think, I think this is a middle ground that we need to achieve, say: Look, we are not going to completely umbrella the whole United States of America, we are going to create an area of uncertainty by targeting areas that we are going to cover. But to tell people we are going to have a big umbrella over the country, that is not honest.

Dr. WAGNER. I don't think we have been saying that it is going to be a fully impenetrable umbrella anytime soon.

Mrs. LLOYD. I don't think it is a good goal, if we can inject enough uncertainty into the Soviets' plans or Third World countries' plans, to say: Hey, you may think you can, but you don't know you can, then I think you have achieved a worthwhile objective, that the American people will sell and tell them it's not going to be right away.

Dr. WAGNER. An early objective.

Mrs. LLOYD. I think we are getting too grabby.

Dr. WAGNER. The early objective might be even more limited than what you are implying. It might be to simply defend ICBM's effectively. So, again, in that sense as well, not only in the sense of transition from partly nuclear programs.

Mrs. LLOYD. It could protect the controlled area?

Dr. WAGNER. It could do that. I think there are a lot of differences.

Mrs. LLOYD. I personally think—I am not a knowledgeable person; I don't pretend to be. But I personally think that is why the Soviets are so frightened, because with this area of uncertainty injected, they say: If we spend all of these billions and billions of dollars, when are we going to achieve our target?

Dr. WAGNER. Could I respond to one point that you made earlier about convincing the American people and the concern that they won't believe us.

I don't talk to the cross-section that you do, and I may be wrong, but I would guess that many of those, that people who would support an SDI in general would be willing to support one which used nuclear concepts for its effectiveness and that many of the people who will object to a nuclear component to an SDI are likely to be people who won't want an SDI anyhow whether it is nuclear or nonnuclear. That is a surmise on my part.

Mrs. LLOYD. I didn't mean to take so long. That is where you and I differ. Thank you.

Dr. WAGNER. In a sense, I am encouraged by your answer.

I am taking an awful lot of time this afternoon.

Mr. STRATTON. I think it may prove useful in the long run.

Dr. WAGNER. Well, I hope so.

Mr. STRATTON. I apologize for taking up your time.

SUPPORT FOR R&D TESTING ACTIVITY

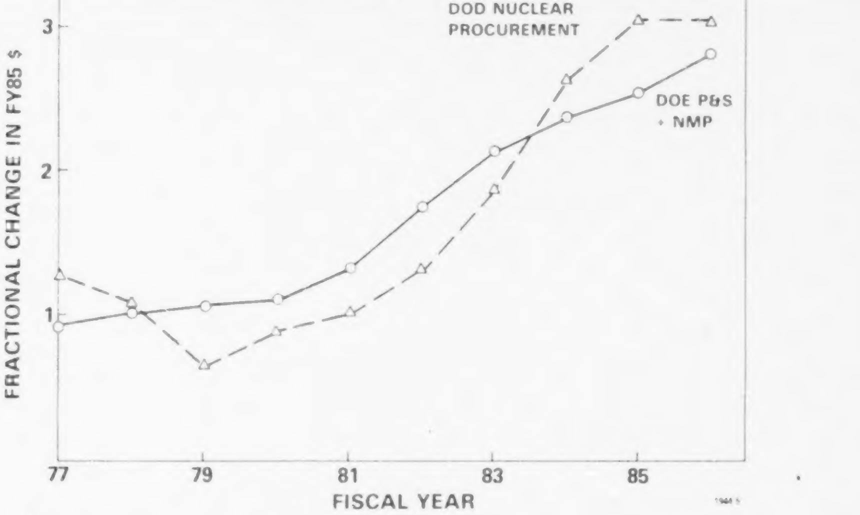
Dr. WAGNER. I would like to finish by stating my fundamental point that General Hoover's research, development, and testing activity is not supported as fully as it needs to be to do all the things we need done, including SDI research of the kind that I have described, and research on our normal deterrent forces out into the future. In 1979, a milestone in our joint DOD-DOE planning for this program was a rather extensive study that many of you may have heard called the Starbird study. Retired Lieutenant General Starbird, who had been in the nuclear weapons program for three decades at the time, chaired this study; and it forced us to start looking further into the future than we had in the joint planning before.

In the area of research and development, he suggested that the R&D manpower should grow from a level of about 7,400 heads in 1980, which was down from about 10,000 the decade before, up to a level of about 8,500, a growth of about 1,000 or 1,100 heads, or perhaps 15 percent.

My view is that that objective, which we have almost reached now, did not aim high enough, largely because of the requirements for research on the SDI.

Let me make that point by showing you some contrasts between DOD funding for the nuclear component of our defense posture and the DOE funding.

RELATIVE GROWTH OF DOD AND DOE NUCLEAR PROCUREMENT



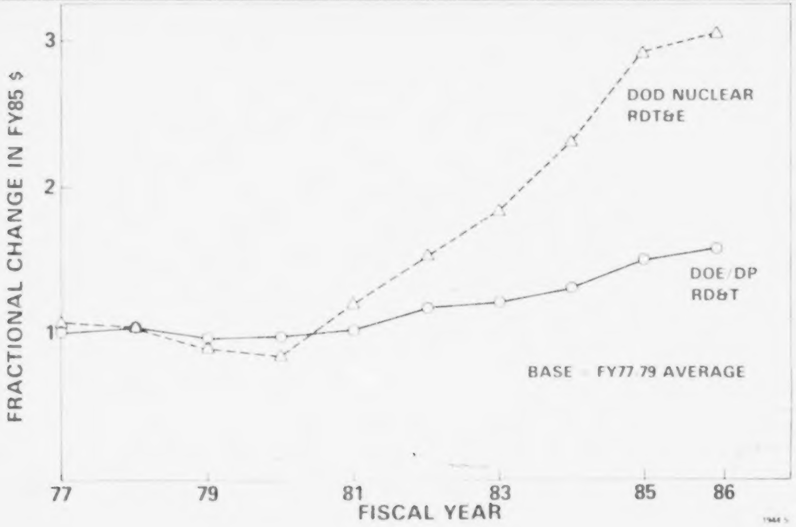
John, if you would put on the first chart, let me explain these charts a little bit more.

This is not dollars on the left-hand side, this is fractional increase in terms of fiscal year 1985 dollars. So I put the DOD and the DOE, which is a great disparity in total dollars, on the same scale by plotting it this way. The solid line is the Department of Energy's weapon procurement budget, by lumping together the actual weapon production and surveillance and the nuclear materials program which produces nuclear materials for the weapons.

I have contrasted that with the DOD nuclear weapon procurement account. Now, in fact, this number is something of the order of [deleted] and this number is something of the order [deleted] out here, I guess about [deleted] out here in 1986. I have plotted them on the scale so you can see by looking at curves how they have grown. You can see that, with the support of this committee, the Department of Energy budget for weapon production has grown about a factor of three, and that was necessary because of the need to modernize the deterrent stockpile over the last few years. It has just about matched DOD's procurement of the systems that carry the warheads. So I see some sense there.

I believe it makes a rough argument that is sensible. I contrast this with the situation about growth in research development and testing, which is the next chart.

RELATIVE GROWTH OF DOD AND DOE NUCLEAR RD&T



On the same scale, the DOD research, development and testing, that is about [deleted] out here in 1986, has grown roughly comparable to the growth in the procurement. It has grown by a factor of three. There has been some growth in the DOE research development and testing, but it has been in fact 15 or 20, perhaps, as much as 25 percent. It is that disparity that is the point of my concern here. I think that for one reason or another, I am not sure I know the reasons here, the growth in the DOE research, development and testing has not kept pace with what the Department of Defense, from the inputs of a lot of different people and a lot of different modes for programs, has seen fit to commit ourselves to on nuclear research development and testing.

Now, what I have said so far this afternoon has been to try to make a case for you as to why this needs to be higher, not just to make this contrast with DOE, but to say some of the things that we need from the Department of Energy in RD&T, that we can benefit from, if the line were brought on up, SDI, and research on future, more conventional nuclear weapons systems. But a last point and one that in some ways worries me more than anything else, is a point about the Soviet program. I would like to read for you a page from my prepared testimony because I want to get the words right. I want to make sure you don't misinterpret what I am saying about the Soviet nuclear weapons program.

SOVIETS RD&T PROGRAMS

This is on page 30 of my statement, starting on page 30 of my testimony. [Deleted.] General Hoover showed a chart this morning.

[Deleted] is by a much more vigorous research, development, and testing program, one in which there is room to explore the technology beyond stated or DOD requirements almost in an intellectual sense, the same way that characterized the program, back during the fifties and sixties.

It has been at least a decade since there was that kind of latitude, although it was a major feature of the program. So in my mind there are really some compelling reasons for increasing, for committing to a long-term program, of increasing the level of effort in this program, in research, development and testing. We need to proceed, partly because of SDI, but also [deleted].

Mr. **Stratton**. Is this perhaps another good reason why we ought not to take seriously the proposals that I think perhaps back in the election time and on the part of a number of Senators that we ought to ratify the complete total test ban treaty? This would rob us even of what little knowledge we have, would it not?

Dr. **Wagner**. I believe that we don't learn too much [deleted]. I think there are a number of other reasons why a comprehensive test ban is a bad idea. [Deleted.] There are some people who would say that is an argument for signing a test ban. However, there are some other underlying arguments that are against it. One of them is simply the fact that the reliability of our stockpile will inevitably decline without testing because testing is the life of the program and the people on whom that reliability depends will leave the program without testing. That happened during the moratorium from 1958 through 1961. A lot of people at laboratories left during that period. Without trained people, you cannot assess the reliability of the stockpile, and therefore, because weapons do age, it will in fact decline.

I think the lab directors can probably amplify on that point better than I can.

Mr. **Hopkins**. You said just a minute ago [deleted].

How do you know that?

Dr. **Wagner**. [Deleted.]

Mr. **Hopkins**. Thank you.

Mr. **Spratt**. Dr. Wagner, you mentioned that there is a need for a new source of tritium production, and you also indicate that by the mid-1990's it's essential that this new production reactor be brought on line for this purpose. I understand that funds were deleted or at least deferred for the startup of the next new production reactor. And could you give us some clarification as to the reasons for this?

TRITIUM AND PLUTONIUM PRODUCTION

Dr. **Wagner**. I think, sir, that it would be best to ask General Hoover, perhaps, or Mr. Cochran, about that point. I would like to say again, though, that the Department of Defense does feel that providing a sound, secure, safe source of tritium and plutonium production for the long-term future is a very high priority for us. One of the approaches to that would have been a large new production reactor. It is my understanding that the DOE has another approach which may actually be better from the political sense and perhaps even from a technical sense, and I think you should hear about that from them. I am rather enthused about that approach, as a matter of fact.

The other point I would like to make, then I will close for good, following on to your point, is that there is another technological approach to providing some flexibility and resilience in the nuclear material program, and that is special isotope separation. Mrs. Holt referred to that in her opening statement. I could only second that point very strongly that I think we are long past due in implementing that technology in a full production capability. It would allow us to put some material on the shelf, in fact, [deleted].

We could clean up during the decade of the nineties; we could purify the plutonium that has circulated through the weapon production process so as to reduce its intrinsic radiation, which I think is going to be a concern to the Navy out in the next decade and perhaps the next century to keep the radiation dose down for the sailors on the ships.

I suspect that once in place, and once isotopically pure, if you will forgive the jargon, isotopically pure nuclear materials are available, that a lot of different technological approaches would open up for us that we don't have today, also providing over the long term for a good, sound supply of new material, tritium and plutonium.

Mr. **Hopkins**. Thank you.

Dr. **Wagner**. That is all I wanted to say.

Mr. **Stratton**. Thank you very much, Doctor, and we appreciate your frankness on these matters and we would be very happy to—Mr. Courter.

Mr. **Courter**. Thank you, Mr. Chairman.

Doctor, on the DOE R&D program, I came in a little late and I apologize. Do you have an R&D program that deals with the conventional as well as nuclear warheads?

NONNUCLEAR R&D AT THE LABORATORIES

Dr. **Wagner**. In DOE, in the laboratories, there is some funding which is DOD funding, a reimbursable program, where DOD, the services, provide the funding for the laboratories to do some work on——

Mr. **Courter**. So it's DOD money?

Dr. **Wagner**. It's DOD funding carried out at the nuclear weapons laboratory at a level—somebody has the number—I suspect it's $10 or $15 million in 1985, maybe a little more than that in 1986. I think that it is important, very important work, and I think the DOE laboratories can contribute something to that important category of nonnuclear munitions that the DOD really gets its money's worth.

Mr. **Courter**. In the nonnuclear area what is your research and development in; is it in accuracy?

Dr. WAGNER. Not so much in accuracy, but the explosive capabilities of shaped charges, to penetrate armor, armor designs to resist penetration by shaped charges.

Mr. COURTER. The point about the graph, the R&D DOE money for nuclear research and development, the point is you think there is not enough?

Dr. WAGNER. That is right.

Mr. COURTER. That is because of SDI, did you say, or simply because you would like more money because [deleted].

Dr. WAGNER. I think it's the SDI, it's to be sure the Soviets don't surprise us and also because there is a kind of underlying level of effort for our own needs out in perhaps the nineties that we can identify some very specific things for which there is not enough effort.

Mr. COURTER. What is your goal in the R&D, what are you striving for? I can understand if it is SDI oriented, you are looking at what you mentioned before, the capability of using nuclear energy and creating a high-cost energy system that has a capability of destabilizing ICBM's. But outside of that, are you looking for smaller warheads, more powerful warheads, or what is your goal?

Dr. WAGNER. In fact, several things like that. There are three or four classical lines of development in nuclear weapon research. [Deleted.]

There are advances to be made there. We are going to need a lot more of the kinds of things that have been done for tactical weapons, for strategic weapons out in the future. Let me give you one example.

For many of the tactical weapons that we are putting overseas today, [deleted]. It may come to be that in order to allow mobile system for ICBM's, we would want to apply that to ICBM technology as well. Today, [deleted]. To try to reduce [deleted] will require a long research and development program, so there is a whole lot of things like that. I could go on further.

Mr. COURTER. Is a lot of your R&D in nuclear warheads, can you do a lot of it without testing? Is your argument that testing is necessary?

Dr. WAGNER. You really have to have an adequate level of nuclear testing. It's the scientist's connection with reality and if he loses that connection he goes off.

Mr. COURTER. You couldn't modernize a warhead using state-of-the-art technology without testing?

Dr. WAGNER. You just can't do it. There are some parts that you can do without.

Mr. COURTER. You can't replicate a warhead to the Minuteman III without further testing?

Dr. WAGNER. You can't really do anything to what we call the physics package, gadgetry that produces the yield, without nuclear testing.

Mr. COURTER. I am saying replicate.

Dr. WAGNER. To replicate an old design, you may or may not be able to. I think the lab directors ought to address this point in more detail. But if it is a relatively old design, it may have materials in it that, for instance, were proprietary materials at the time and if functioning of the physics depend very much on the details of the materials and processes, and in many ways, there is so much at the edge of state-of-the-art that you can't replicate those processes 20 years after they have been—after production was finished without being sure that you did it right with the testing. In some cases you can, but——

Mr. COURTER. How many—in your DOE R&D and nuclear warheads and weapons, how many tests do you do a year?

Dr. WAGNER. The United States does on the order of [deleted] nuclear tests, [deleted] a year.

Mr. COURTER. Are they all under the auspices of DOE?

Dr. WAGNER. [Deleted] are under the auspices of DOD for nuclear weapon technology, blast effect.

Mr. COURTER. OK, the last question I have is, does DOD do competitive research in nuclear weapons warheads with DOE?

Dr. WAGNER. No, sir.

Mr. COURTER. Is that by law?

Dr. WAGNER. Yes, sir, the service members here have about 5-minute statements on particular requests for stockpile production a little bit along the lines of what you were asking on MX. I wonder if we can proceed with them?

PREPARED STATEMENT OF RICHARD L. WAGNER, JR.

Mr. Chairman and members of the subcommittee, it is my pleasure to appear before you again this year to discuss the Department of Defense's perceptions of this country's Nuclear Weapons Program—its importance, the requirements for it, and its adequacy. This year I would like to focus my comments on what I view to be both the strengths and weaknesses of the program. I have invited one member of the Military Liaison Committee from each of the military departments to accompany me. Following my testimony, each will spend a few minutes discussing the specific nuclear weapons requirements of his service.

I wholeheartedly support General Hoover's acknowledgement of our debt to Mr. Price. He deserves, because of his support of the program for many years, much of the credit for our being able to maintain and enhance our deterrent posture. More recently, his interaction with the previous administration, at the highest levels, made it possible to begin to correct a most serious matter—the ability of the Department of Energy to execute its weapons production and Materials Production Programs in support of the Nation's security posture. Our debt to Mr. Price can never be repaid, and ~~our~~ obligation will be to continue the initiatives resulting from his interaction and continuing encouragement, in order to maintain and strengthen the defense posture he created and nurtured during his involvement in the program.

This year marks the 40th anniversary of the end of World War II. During the past four decades, there has been no armed conflict between the United States and the Soviet Union, or between NATO and the Warsaw Pact—in contrast to the first 45 years of the 20th century, in which we witnessed two global conflagrations. These past 40 years also represent the longest continuous period of peace Europe has known since the early 19th century. This is no accident. It is, in large measure, a result of the policy of deterrence adopted by the United States and the Western democracies in the wake of World War II, a policy designed to deter any aggression, either conventional or nuclear, against ourselves or our allies.

Even if we ignored the direct and indirect role of nuclear forces in deterring conventional attack, in a world where the knowledge of nuclear weapons cannot be banished, the United States would still have to maintain nuclear forces to deter nuclear attack on its allies and on itself. That does not mean we are under any illusions about the consequences of a nuclear war between the major powers; we believe that neither side could win such a war. This recognition on our part, however, is not sufficient to prevent the outbreak of nuclear war: it is essential that the soviet leadership understand this as well.

But while we work to preserve deterrence, we must also think about and plan against possible failures of deterrence. If deterrence should fail, we must plan for flexibility in our forces and in our options for response, so that we might terminate the conflict on terms favorable to the forces of freedom, and reestablish deterrence at the lowest possible level of violence, thus avoiding further destruction. The ability to do this, of course, strengthens deterrence in the first place. This concept of seeking both to enhance deterrence, and to limit the level of destruction, by having flexible and enduring forces is not new. It has been squarely in the mainstream of American strategic thinking for over two decades.

Maintaining a stable strategic deterrent requires a variety of retaliatory strategic forces—a triad of land-based ICBM's, manned bombers, and submarine-launched ballistic missiles. The unique characteristics of the independent and separate components that make up the triad bolster deterrence by acting in concert to complicate Soviet attack planning, making it more difficult for the Soviet Union to plan and execute a successful attack on all these components while at the same time defending against their combined and complementary retaliatory effects. The triad also acts as a hedge against a possible Soviet technological breakthrough that could threaten any single strategic system. In addition to a strong triad, stability of deterrence in a crisis and the effective and responsible use of our nuclear forces depend on a responsive and survivable command, control, and communications system.

While America's strategic nuclear systems are NATO's ultimate deterrent force, we also have nonstrategic nuclear forces in Europe to help deter a Soviet nuclear or major conventional attack on our NATO allies. This deterrence is founded on NATO's ability to retaliate against the Soviet Union and its Warsaw Pact allies in Europe, and on a clear Soviet recognition that the use of nuclear weapons risks engagement of the strategic nuclear systems of the United States.

The Department of Energy, in partnership with the Department of Defense and the Congress, has provided this deterrent capability to the United States by developing and producing the nuclear warheads to arm the retaliatory strategic forces as well as the nonstrategic nuclear forces. As the Soviet threat has evolved, so too has our strategy of flexible response, and the DOE has responded to this evolving strategy with new designs and new capabilities to maintain and enhance the flexibility of our responsive posture. They are full partners in establishing and continually improving our capabilities, thus preserving our posture.

However, their contribution goes beyond providing this concrete capability, as the Scowcroft Commission's first report stated what I mean succinctly:

"Deterrence is not an abstract notion amenable to simple quantification. Still less is it a mirror-image of what would deter ourselves. Deterrence is the set of beliefs in the minds of the Soviet leaders, given their own values and attitudes, about our capabilities and our will. It requires us to determine, as best we can, what would deter them from considering aggression, even in a crisis—not to determine what would deter us."

In previous testimony, I have discussed how the DOE advanced technology relates to what I called earlier "keeping the Soviets in a deterred frame of mind." Deterring the Soviets has often been thought of simply as a matter of keeping the Soviet attack exchange calculations unfavorable to them, both in our view and in theirs, thereby avoiding a Soviet attack.

[Deleted.]

The Soviets have always been concerned with "image"—their obsession with propaganda and legitimacy shows that, their images of themselves and of us, in the context of deterrence, are made up of many things—numbers and sizes of weapon systems, their technical characteristics, general technological capabilities of the two societies, national will, and purpose and place in the flow of history.

[Deleted.] But, on the other hand, we know that tests between our technologies, such as U.S.-made jets versus Soviet-made jets over the Bekaa Valley in Lebanon, and the technology of our cruise missile developments, are often sobering experiences for them.

I believe these deterring perspectives extend also to the DOE-produced nuclear warhead technologies. [Deleted.] I am certain that the experience reinforced Soviet respect for DOE capabilities, a respect that continues to have deterrent effect.

What deterrence comes down to in the end, then, is to keep things so that, if a crisis comes that they might want to resolve by force, they will have a gut feeling that they won't measure up against us. It is often said that the Soviet leaders are conservative. They are when they feel inferior, but they often are not when they feel they have an edge: they often have taken advantage when they perceive an opportunity, such as in Cuba or Afghanistan. I believe that our level of technology in itself, quite apart from exactly how it is built into fielded systems, affects their overall image of themselves and of us, and thus can have a significant deterrent effect. [Deleted.]

In discussing what's right with the DOE Nuclear Weapon Program, so far I have talked rather generally about its success in contributing to deterrence. More specifically, however, the DOE nuclear weapons development and production system has performed superbly in recent years. New weapon designs with greatly enhanced effectiveness, safety and use control features have successfully completed development. These designs, whose increased complexity is essential for deterrence, are being produced [deleted].

[Deleted] conversion of N reactor to weapon-grade plutonium production and reactivation of the Purex Fuel Processing Plant have been accomplished. Upgrade of the L reactor was completed in 1983, and restart is scheduled for later this year. Upgrades [deleted] have begun, and development of both higher productivity reactor cores and special isotope separation continues.

Underground tests have also been conducted [deleted].

This test program has not only continued vigorous pursuit of basic physics understanding of nuclear explosives, but has included a series of nuclear tests of stockpiled weapons to verify confidence in our deterrent. As further evidence of a healthy and innovative enterprise, the various concepts for so-called third-generation or nuclear directed-energy weapons have emerged in the past 3 years. Research on these concepts is at a very early stage, [deleted].

[Deleted.]

Finally, these challenging development and production tasks were accomplished by the DOE in the midst of sweeping upgrades, across the entire weapon complex, of security and environmental controls. These upgrades involved improved facility features, enhanced security forces, and in some cases major shifts of particular work. A more safe and secure condition now exists, and more will be done in the near future.

I've covered what is right with the Nuclear Weapons Program, both in the broad sense of its contribution to our deterrent posture and in the details of responding to the President's program to modernize all three legs of the strategic triad, and to improve our nonstrategic nuclear deterrent. The Department of Energy has engaged in a truly cooperative spirit with the DOD to acquire and field these systems and the warheads that arm them.

Now let me discuss what's not right with the Nuclear Weapons Program. The quality is superb, as I'm sure you know, and production requirements are being met. [Deleted.]

In previous years, I have discussed the [deleted], in most of its areas of activity. This is most pronounced in three areas. First, unfortunately, though perhaps necessarily, I will discuss later how [deleted] places requirements on R&D that are just as important as DOD's production requirements. And finally, I am concerned about a congeries of factors which divert the attention of the program away from its core activities.

At first glance, the defense programs budget outlays seem to have recovered from the chronic underfunding at the period of the 1970's. With the support of this committee, the total funding has risen from $3,187.3 million in FY 1981 to $6,826.6 million in FY 1985, which corresponds to about 78 percent real growth. A substantial part of this growth, however, has been needed to support the requirements of production for the absolutely essential stockpile modernization program. The program is supporting, at significantly increased levels, activities such as safeguards, security, and environmental protection, also required because of changing requirements and underfunding in the past. Such activities, while important, divert both manpower and resources from the primary mission of the program. General Hoover and General Withers can amplify at length about these "taxes", real and figurative, on the program. The net effect has been too little growth, compared to the need, in effort devoted to the cutting edge of the technology in the RD&T Program.

In the area of RD&T, there are two things which drive the need for resources: (1) our own needs for advanced development for future systems, which are formidable, and (2) [deleted]. Let me talk first about our own R&D needs.

In the area of strategic forces, one of the major challenges confronting the U.S. defense and nuclear weapons communities is the fact that rather, we must be able, in a retaliatory second strike, to destroy those assets which remain to him, and which he would like to count on, in his view, to pursue the war. [deleted.] But, it is a problem which the services, DNA, and DOE must work and are working.

One of the more promising approaches, [deleted] also the design laboratories are investigating several promising concepts of [deleted].

The other dimension of our strategic problem is that the U.S.S.R. continues to [deleted]. We are investigating the feasibility of a small mobile missile. You will recall that the President's Commission on Strategic Forces recommended that engineering design should be initiated to permit deployment of such a missile beginning in the early 1990's. The wide area mobile-based version will present the design laboratories with a new challenge. Such a system would require additional safety, security, and command and control features beyond those essential on silo-based systems. In order to accommodate such features [deleted].

Another important element [deleted] is the development of a better understanding of the kill phenomenology itself. Here the defense nuclear agency has an active program which is designed to define such effects as [deleted].

The need to understand better the effects of nuclear explosions is becoming more crucial [deleted] are pursued. No longer is an order of magnitude estimate of weapons effects adequate. [Deleted] and lethal mechanisms has become increasingly important. The responsibilities of Defense Nuclear Agency in these areas, as well as directed effects lethality for SDI, are more crucial than ever; and the DOE laboratories, as well, must contribute to the work. This is an integral part of the DOE R&D activity.

Replacement of the [deleted] the warhead for this missile will have modern detonation and fire safety features [deleted].

With respect to RD&T pertaining to theater nuclear forces, the political realities in NATO and the related need to modernize our conventional forces will mean that modernization of our nuclear forces will not move as rapidly as those of us would like who are familiar with its obsolescence. Instead, our strategy must be to proceed with modernization where we can—principally to continue with the nuclear artillery developments (albeit at lower total build levels) [deleted] and to put greater effort into providing increased survivability for the smaller number of older systems that we will have, so that their overall deterrent quality is enhanced. This survivability work will also draw heavily on DOE R&D resources—principally at Sandia—so that in this area of TNF, as well as for strategic systems, there will be a net need for increased RD&T.

In the near term, we are hopeful that the Congress will support the modernization plan recently submitted to Congress for the artillery-fired atomic projectiles (W82/W79). As indicated in the May 1984 DOD report on the Nuclear Posture of NATO and numerous subsequent interactions, our existing 155mm and 203mm rounds [deleted].

The development of an improved 155mm warhead in conjunction with the improved 8-inch warhead in production, if funded to completion, will result in rounds which can be deployed in NATO Europe with [deleted] thereby markedly strengthening the deterrence contribution of the short-range nuclear posture.

The DOE and DOD plan to produce a mix of modernized AFAP [deleted]. The planned build will produce a mix of approximately [deleted] production past October 1984 of warheads of both types will be [deleted]. Both projectiles will have improved safety, security, range, and survivability over current AFAP's (W33 8-inch and W48 155mm). The total DOE production funds estimated to be expended for both warheads from October 19, 1984 is in accordance with the $1.1B spending limit for production. Stockpile surveillance and maintenance costs associated with these two artillery programs are on the order of $32M per year over the life of the systems involved. Anticipated fielding date of the W82 will be approximately [deleted] assuming funds are appropriated to the level authorized. The planned production of the W79 will be completed in [deleted].

Replacement of obsolete AFAP now in Europe with improved warheads will be carried out within the nuclear stockpile limits agreed to by NATO Defense Ministers at Montebello in October 1983 and SACEUR's implementing requirement study that will be available next month. [deleted.]

Over the longer term, development of is necessary. [deleted.] These systems will also need features which contribute to greatly enhanced survivability, including features in the warhead itself. This emphasis is driven by both the Montebello decision to reduce the nuclear weapon stockpile in NATO and the [deleted] the stockpile.

Thus, over the next decade a major new thrust in theater nuclear force-related RD&T will be in the area of survivability, security, and command/control (s^2c). DOE contributes to this in two ways: with safety, security, and control features built into the weapons themselves, and by helping to develop, with the services and the Defense Nuclear Agency, security and survivability features for weapon storage and transport facilities. [deleted.] All of which contributes substantially to survivabaility and crisis stability. [deleted.] Additionally, B61 bombs with enhanced safety features will replace older Navy B43s and B57s. These are examples of what we're already doing. We'll have to do more and better in the future.

Beyond what's in weapons themselves, we must revise [deleted] through the NATO senior level weapons protection group, which I chair, we are laying the groundwork for [deleted]. One of the most important areas of mutual cooperation and teamwork between DOD and DOE is the invaluable assistance to the DOD and the services in developing new concepts for nuclear weapons safety, security, and survivability.

The technology base resident in the DOE laboratories contributes to our national defense in many ways besides nuclear weapon design and support for warhead production. The Department of Energy laboratories are a unique source and pool of the Nation's technical expertise, which supports the overall national defense infrastructure in useful but often not very visible ways. They have the world's most sophisticated computers and a tremendous pool of highly trained and motivated people. This national resource should be used in the broadest ways we can manage, not exclusively nuclear oriented. Closer interactions with the DOD can draw the theoretical knowledge from the laboratories to many practical applications. The expansion of the technology efforts into the nonnuclear defense area, of course, complements and strengthens efforts to modernize the TNF. Deterrence is best served if both the conventional and nuclear weapons areas are a credible threat to our adversary.

In this regard a memorandum of understanding between the DOD and the DOE has been signed to conduct a cooperative program of research and development intended to bring about major improvements in nonnuclear munitions technology. The DOD and the DOE intend to fund jointly and support a stable level of effort at the DOE weapons laboratories on applied research and development of mutual interest. In FY 1985 the DOD is supporting this program with $5 million, with expectation of at least $9 million in FY 1986. Most of the work under this agreement will be of a basic, general purpose and long-term nature covering such areas as experimental development of explosives, advanced fuzing, advanced armors and terminal ballistics. I firmly believe that our interest in expanding the R&D areas of the national laboratories in no way modifies their national security mission of nuclear weapons R&D. It will take greater advantage of their existing capabilities. The skills and knowledge acquired through research on nuclear weapons can be exploited to advance the technology of non-nuclear alternatives, and we are asking that congress work with us to accomplish this goal.

In the area of non-strategic fleet weapons, the [deleted] the contrast between the Soviet and United States postures is more pronounced in this area than in any other category of the nuclear balance. Nuclear capability is clearly a major—perhaps the dominant—consideration in the Soviets' view of the maritime correlation of forces. In contrast, those nuclear weapons which we currently have deployed—with the exception of TLAM(N), which was introduced to the fleet last year—average over 23 years in age. Therefore, [deleted] with a significant gap between these two ends of the spectrum.

We have begun to redress this situation, including a reassessment of the importance of this capability, in the past few years. The intention is [deleted]. We had neglected this area for so long that redressing the situation required not only a set of programs, but also reestablishing a whole infrastructure to deal with fleet nuclear problems. There was a somewhat halting start in the early 1980's, but I believe the Navy is now firmly committed to this modernization. As evidence, among many other actions, the Chief of Naval Operations has recently initiated a program within all sections of the Navy, which addresses the importance of being prepared to fight and survive at sea in a nuclear environment. He has personally appeared in three "Special CNO Film Reports" (Nuclear Warfare at Sea, Nuclear Effects at Sea, Nuclear Defense at Sea) which were shown to all Sea Service Members, and has directed that TNW be included as a part of future war gaming and fleet exercises. This is only one of a number of activities. His leadership, by example and direction, has now built the foundation for what I perceive to be a long-term navy commitment to modernizing its current tactical nuclear capabilities.

As a result of this growing commitment, replacement nuclear systems are being developed, [deleted].

The SM2(N), a replacement for the Terrier Sam, which has been operational for 23 years, is supported by this year's DOE budget request with a projected initial operational capability [IOC] in [deleted]. In addition, the submarine-launched ASW standoff weapon [ASW-SOW], a replacement for SUBROC, which was introduced to the fleet in 1964, is supported in the out years of this budget request with a projected IOC of [deleted] and the Navy is currently working on a [deleted]. All of these systems will require significant R&D. One example of an as-yet-unrealized potential in this area is the use of [deleted].

In March 1983, President Reagan took the first important step toward what could be a new and better way to deter war, strengthen stability, and ensure peace—by moving away from exclusive dependence on nuclear retaliation toward greater reliance on defensive systems. To that end, he directed the establishment of a comprehensive and intensive research program, the Strategic Defense Initiative [SDI]. The

SDI is a research program to vigorously pursue new technologies in order to determine whether we can create an effective defense against ballistic missiles which would strengthen deterrence, increase our security and that of our allies, and thus reduce the risk of war. With results of this research, a future President and Congress could make an informed decision on whether to enter systems development. This research program is based on a multitiered ballistic missile defense concept with research concentrated into five key technology areas: directed energy weapons; kinetic energy weapons; sensors; battle management and command, control and communication systems; and supporting technologies.

In the spring of 1984, the Strategic Defense Initiative Organization [SDIO] was established to manage this program. The SDIO provides central planning for the entire effort and uses centers of technical and management excellence within the services, DOD, DOE, and other non-DOD agencies for decentralized execution of research efforts. Although funded separately, the DOE program is integral to the overall SDI program with specific importance in the directed energy as well as the survivability, lethality, and supporting subsystem technical areas. In addition, with DOD funding, the DOE laboratories are important contributors to several of the SDIO Nonnuclear Development Programs.

A memorandum of agreement [MOA] between DOD and DOE was approved in July 1984 establishing an SDI DOD/DOE Steering Committee comprised of the Deputy Secretary of Energy, the DOD Director of the Strategic Defense Initiative Organization [SDIO], and the chairman of the Military Liaison Committee [MLC]. This steering committee provides DOD program coordination and integration, and a mechanism to resolve issues.

In particular, nuclear-driven directed energy concepts, including x-ray lasers, [deleted] represent the area of primary involvement between DOE and DOD. The DOE has complete responsibility for nuclear source development and for conducting underground nuclear tests at the Nevada test site. The DOD will continue to assume primary responsibility for developing acquisition, tracking, and pointing and other development efforts required in conjunction with this program. Close coordination of all elements of this joint program will be effected through special coordinating groups with representatives from DOD and DOE.

The SDI is a program of vigorous research focused on advanced defensive technologies with the aim of finding ways to provide a better basis for deterring aggression, strengthening stability, and increasing the security of the United States and our allies. As a broad research program, the SDI is not based on any single or preconceived notion of what an effective defense system would look like. While the long-term goal of the research program is a truly effective nonnuclear defense, there are a variety of reasons for including nuclear research at this time.

For example, we must be particularly concerned about [deleted] of third generation nuclear weapons, which would use the energy released by a nuclear explosion in much more discriminating and effective ways. The change could be greater than that caused by the second generation transition from fission to thermonuclear devices. [Deleted.] Although we believe nonnuclear systems would be more consistent with our long-term policy objectives for strategic defense, we need to enhance our nuclear R&D effort [deleted] the Fletcher study said of the x-ray laser.

It is important [deleted] as will be discussed immediately below, all these needs taken together—the need to [deleted] either in terms of manpower or modern facilities. But beyond these identifiable areas of activity, there is another concern which stresses the RD&T Program.

I have referred several times so far to concerns about [deleted]. I'd like to elaborate on that, because it is central to two of my concerns about our program—our reduced level of effort in RD&T (which I have already discussed) and our lack of [deleted] (which I will discuss later).

We know that [deleted]. In my view, we have here a recipe.

Perhaps the only way we can insure against this danger is by a much more vigorous RD&T program—one in which there is room to explore the technology beyond stated or understood "requirements." It has been at least a decade since there was this latitude, although it was a major feature of the U.S. Nuclear weapon program until about 1970.

Let me amplify on this [deleted].

In the 13 years that followed, we were able to [deleted].

Thus, it should be no surprise that where we have [deleted]

The President's hope, I believe, is that eventually both we and the Soviets will move to a defense-dominated, instead of an offense/retaliation-dominated, strategic relationship, and that that situation will provide both more stable deterrence and the possibility, eventually, of relying on something other than threat of retaliation for our safety. But until then (which in this context may mean many years), the path to that new strategic relationship will be through a continuing technological competition, moderated and shaped partly by arms control. During that still-competitive phase, the United States cannot afford to be less than competitive in any of the major areas of technology, especially not in an area that may have such leverage on defense capability as nuclear directed energy weapons. [deleted.]

On our part, national policy has been clear regarding special nuclear materials for nuclear weapons—such materials should not be the limiting factor in determining the nuclear force structure, and a [deleted].

We are working closely with DOE to assure that DOD requirements approved in the annual nuclear weapons stockpile memorandum are achieved. [deleted].

The facilities in which DOE produces the Nation's special nuclear materials are [deleted].

The likelihood of Soviet initiatives or surges in weapons systems in the farther future is [deleted]. In virtually all areas of defense industry, the gigantic civil industrial base of the United States provides a backlog of capability to counter possible Soviet military production surges, and thus helps to deter such surges. The same thing is true for the industrial base for our nuclear deterrent—the U.S. aerospace industry provides a surge capability—with the sole exception, I believe, of the one element that the Federal Government, by law, must provide—capacity to produce special nuclear materials for defense purposes. [deleted]

I believe we are most likely to achieve deep and balanced reductions in nuclear forces if the Soviets are convinced that we are in a position to deny them any advantage from further arms buildup. [deleted.]

In 1964, 13 reactors were producing plutonium and tritium for weapons program. Today there are four operating production reactors, three at Savannah River, South Carolina (P, K, and C), and one, the N reactor at Richland, Washington.

[Deleted] start-up of the Savannah River L reactor was scheduled for October 1983, but it has been delayed as a result of court actions on environmental issues. [Deleted.]

The Savannah River production reactors were built in the early 1950's and are undergoing refurbishment to prolong their operating life into the 1990's. [Deleted.] With regard to uranium, we have seen the amount of oralloy (uranium enriched to 93.15 percent in the isotope U-235) available to the weapons program [deleted].

Acknowledgement now of a commitment to support such a funding request would allow prudent and responsible management of such a program, and might provide additional economies by allowing, for example, early commitments for the large quantity of electric energy necessary to support such an enrichment program. [Deleted.]

PRODUCTION/STOCKPILE.

The nuclear weapons stockpile exists only to support deterrence, and it is difficult to quantify deterrence—some combination of force levels, threat, perceptions, intentions, capability. Because of this, there is no "formula" for arriving at levels for the number of weapons. Fundamentally, it will always remain a subjective, long-term judgment.

Our requirements for nuclear weapons, which are prepared jointly with the Department of Energy and forwarded annually in the nuclear weapons stockpile memorandum to the President for his approval, are based upon inputs from the CINC's and tied closely to approved programs for nuclear weapons delivery systems. These systems are typically high visibility procurements which receive high-level attention both within the administration and the Congress. The force levels finally arrived at reflect a compromise between the contending factors of the threat, required target coverage, support of deployed forces, survivability, support of allies, procurement cost, and life cycle cost. For nuclear-only systems, the cost of the nuclear warhead is typically only a small fraction of the total system cost.

For some dual capable systems, such as artillery and tactical bombs, the situation is somewhat different and the nuclear weapon procurement is not closely tied to the weapon delivery system procurement. Nonetheless, in arriving at numerical requirements, similar compromises are made between the contending factors described above. However, in the case of these dual capable systems, it is difficult to ascribe a cost to the nuclear portion of the dual capable delivery system. As a consequence, some are tempted to argue that these nuclear weapons are regarded by the services as "free" and not subject to the same degree of detailed justification as the dedicated nuclear systems. This is not true—any nuclear weapons system involves a significant degree of cost, both dollar and manpower, to the using service and the decision to obtain or maintain that capability is taken with careful deliberation. But beyond that, the bulk of these dual-capable systems have, for several years, received careful scrutiny in the NATO political context to be certain that we have the minimum essential number. This was underway long before the Montebello decision, and when SACEUR makes his report next month, it will lead the way to further reductions. With the numbers receiving such careful attention, the remaining issue is one of the need for modernization; the stockpile for these dual-capable systems is unquestionably obsolete.

I have not dealt in detail here with our requests for production of individual weapons, because those requests are covered by representatives of the services. From the point of view of the overall production, while the DOE budget requests represent what is needed to support DOD's stated requirements, I remain concerned that the production facilities remain somewhat marginal in regard to restoration and lack of redundancy. However, good progress has been made with the very welcome and gratifying support of this committee and, while the restoration program needs to be sustained, I believe that the corner has been turned. My areas of strong concern then, are with regard to the other two main components of the program—RD&T and nuclear materials.

I'd like to turn briefly, now, to a third area of concern, in addition to RD&T effort and SNM capacity: Because of several elements in this climate of the past decade, the attention of the DOE Weapon Program has been diverted from its primary functions. The Weapon Program has gone through periods of being an orphan within the Federal Government, with two new sets of adoptive parents during the last decade. During each adoption, both the parents and child have spent a lot of effort becoming acquainted. Further, at least once, when there was consideration of merging DOE with the Department of Commerce, much the same sort of activity had to be endured by the Program. The recent issue raised by Senators Nunn and Warner, which resulted in the amendment by Senator Domenici directing a study on funding for the program, has caused similar concerns. Between the requirements of developing a new constituancy in its new home, preparing for possible moves to other foster homes, and providing oversight of the necessary, but diverting, responsibilities in the areas of safeguards and security and environmental protection, the attention of many within the program has been spread too thin, away from its primary role. I believe it is a testimony to the dedication and competence of the people involved that the quality of the product for the Nation has remained good; but there must have been an impact—something we would have had for the Nation's defense that we don't have today. My point in raising this with you is simply to add another dimension to the importance that attaches to this committee's continuing support of the program.

CONCLUSION

Let me summarize by saying that the DOE Program has responded heroically [deleted]. In the area of RD&T within the present funding and manpower constraints, I believe the DOE cannot do justice to both the base nuclear weapons program and SDI, and both are essential, [deleted]. Finally, the nuclear weapons program has had many distractions to deal with, which make it doubly important to fully support the program.

This year's DOE budget request, if fully successful, is barely adequate to support the nuclear weapons program, and thus deserves this committee's fullest support. Because of these problems, I believe we must look farther in the future. There are many considerations, but let me narrow down to two concrete items.

In the area of research and development, the DOD/DOE long-range resource planning group (Starbird study) recommended, in 1980, a 15-percent increase in manpower, from 7,400 in 1980 to 8,500. Progress in achieving this objective is continuing, reaching 8,150 in 1985, and planned to reach 8,400 in 1986. However, the Starbird study did not anticipate the inception of a new program, the President's Strategic Defense Initiative [SDI], in which the Department of Energy has a significant role which constitutes an unforeseen expansion of its ongoing responsibilities. In order for DOE to support this essential activity, the level of effort in the core program has actually decreased in the last few years; this loss directly impacts the DOD by reducing development activities for our future weapon systems. Therefore, I feel that the Starbird study manpower goal of 8,500, to be consistent with the initiation of SDI, should be increased substantially, perhaps to around 9,500 in order to maintain proper attention to the core program. I might note that, for comparison, since the late 1970's, the increase in the corresponding DOD nuclear weapon RDT&E has been nearly twice the increase in the DOE defense programs RD&T. Finally, I believe that, to begin to build a resilient position for plutonium and tritium production, an isotope separation capability must be put in place as soon as possible.

That concludes my formal testimony. I would be happy to answer questions, although in the interest of conserving time, I suggest that the military department representatives first be allowed to discuss their nuclear weapons requirements.

STATEMENT OF BRIG. GEN. SIDNEY DAVIS, DIRECTOR, NUCLEAR AND CHEMICAL DIRECTORATE, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS, DEPARTMENT OF THE ARMY

Mr. STRATTON. General Davis.

General DAVIS. Mr. Chairman, members of the committee, it seems like it was only yesterday I was here before this same committee. The last year has certainly gone by real fast. It is a pleasure to be back.

I have a short statement I would like to enter into the record. Then I would like to show a few charts.

SEC. 1635 DOD AUTHORIZATION ACT, 1985 (P.L. 98-525, 19 OCTOBER 1984)

"AUTHORIZATION FOR PRODUCTION OF THE 155MM ARTILLERY-FIRED ATOMIC PROJECTILE"

$50M authorized for DOE facility construction.

Total W79 and W82 may not exceed 925.

Total DOE production funds after 19 October 1984 may not exceed $1.1B for both AFAP.

AFAP must be produced non-er after 19 October 1984.

SECDEF must submit a plan to Congress to implement.

Mr. Chairman, when we appeared before your committee last year, the 155 program was pretty much dead, and so we came with our hat in our hands, and we were kind of looking for a little support and a little guidance, and we certainly got that from this subcommittee.

As a result of your efforts and the other Members of Congress, we did turn around the W82 155 Program.

They did authorize the $50 million for facilities, DOE facilities, total projectile mix not to exceed 925, with a production limit of $1.1 billion. No enhanced radiation would be built after October 19, and the Secretary must submit a plan to the Congress.

I believe it meets the guidance of the Congress. The breakout will be [deleted] of the 8-inch projectiles. At the time the decision was made, we had about [deleted] already produced, [deleted].

We looked at the parts we had on hand, and our requirements, and we decided to go out to the end of [deleted] to be the 155 W82 nonenhanced radiation. I reiterate the nonenhanced radiation. In spite of what you read in the paper, we are not trying to get one over on you; it is going to be nonenhanced radiation.

Mr. STRATTON. General, I thought that General Rogers indicated that the large percent of the artillery was in the 155, but you are producing fewer for the 155.

General DAVIS. Yes; our problem was the 925 limit. We had a moving train that had already produced [deleted]. We had millions of dollars of parts on hand for those 8-inch rounds. The end of this year, as an example, we would have [deleted] and the production line is all set up, so we went out to [deleted] sir, but we are in a heck of a lot better shape this year than we were last year.

Mr. **Klein**. General, is it the intention of anybody within DOD to request some relief from this particular section of the law?

General **Davis**. Sir, the key right now is General Rogers. In his nuclear weapons requirement study, due in around March, we have to see what his requirements are. We have to balance that with the needs of the other commander in [deleted] and then determine our requirements.

[Deleted.]

Perhaps this chart [deleted] will explain it, sir. I am going to talk about the artillery fired atomic projectiles. When you look down around here, the CINC's have requested around [deleted]. Within our current stockpile, we have about [deleted] which includes about [deleted] of the 8-inch new rounds.

We had planned to modernize in fiscal year 1984, building [deleted] of the 155 projectiles and [deleted] of the 8-inch projectile. Also, we were looking at the LANCE follow-on.

Congressional authorization, however, killed the 155 Program. We got it back with your support, and so it is a mixture right now.

Here is the problem. [Deleted.] As an example, in [deleted] alone, we have over [deleted] atomic projectiles. Included in the [deleted] are about [deleted] programs of cooperation with our allies. So, I guess what I am saying up front is, you cannot replace [deleted] with [deleted].

This gives you a breakout of the magnitude of the 155/8-inch delivery system we have on hand. As you can see, the 155 greatly exceeds the 8-inch systems.

General **Davis**. I guess if you look at it from a Soviet perspective, and if you look at two corps units in two corps areas in Europe, you can see if we have only 8-inch howitzers to contend with, their targeting problem would be relatively easy. But since you gave us a capability with the 155, we have made it a bit more difficult for them. That, sir, is the Army MX Program.

Mr. **Stratton**. Any questions?

Mr. **Courter**. I got a little confused on all those numbers. What is the present inventory of nuclear projectiles?

General **Davis**. Currently we have around [deleted].

Mr. **Courter**. [Deleted.]

General **Davis**. Yes, sir.

Mr. **Courter**. Where are they located?

General **Davis**. We have [deleted].

Mr. **Courter**. [Deleted] across the board?

General **Davis**. Yes, sir.

Mr. **Courter**. [Deleted.]

General **Davis**. Yes, sir, but of the [deleted] are the old ones, and we have roughly about [deleted] of the new ones.

Mr. **Courter**. When you say the old ones——

General **Davis**. The old 8-inch round and old 155 round.

Mr. **Courter**. What is the range of the new 155 round and the new 8-inch?

General **Davis**. Range of the old ones was [deleted] kilometers, the new one will go out to [deleted] kilometers.

Mr. **Stratton**. Could I follow up on that? [Deleted.]

General **Davis**. I am sure that will be discussed. I don't know exactly what is happening on it at this time.

Mr. STRATTON. Presumably the only reason that we are not delivering them.

Mr. COURTER. You probably know the answer, or you may not. In order for those nuclear weapons to be used, obviously that is a decision that the President of the United States makes.

General DAVIS. Of course.

Mr. COURTER. And this I should know, and I don't, can it be made unilaterally by the President without NATO concurrence?

General DAVIS. [Deleted.]

PREPARED STATEMENT OF BRIG. GEN. SIDNEY DAVIS

Mr. Chairman, members of the subcommittee, I would like to report on the status of modernization of the nuclear artillery projectiles. For some years we have been working to replace the obsolete W33 8-inch artillery-fired atomic projectile (AFAP) with the new W79 and the obsolete W48 155MM AFAPS with the W82. The W82 development program was stopped by Congress 18 months ago, but an agreement allowing resumption was worked out last summer. This legislation was introduced by Senator Johnston and supported by Senator Nunn. Your subcommittee provided valuable support for this action.

The key provisions and conditions established for the 155mm nuclear program are shown here.

SEC. 1635 DOD AUTHORIZATION ACT, 1985 (PL 98-525, 19 OCTOBER 1984)

"AUTHORIZATION FOR PRODUCTION OF THE 155MM ARTILLERY-FIRED ATOMIC PROJECTILE"

$50M authorized for DOE facility construction.

Total W79 and W82 may not exceed 925.

Total DOE production funds after 19 October 1984 may not exceed $1.1B for both AFAP.

AFAP must be produced NON-ER after 19 October 1984.

SECDEF must submit a plan to Congress to implement. Restart of the 155mm nuclear program was linked to the 8-inch, W79, that is now in production. With the assistance of DOE, OSD and the Joint staff, the Army conducted an analysis of options available under this legislation. The critical need for a modernized 155mm nuclear projectile was reaffirmed and a program recommendation was made to the Secretary of Defense. On 4 February 1985, Secretary Weinberger approved the plan and the next day it was delivered to Congress as required.

This slide shows the highlights of the plan and outlines our current AFAP modernization direction.

SECDEF PLAN TO CONGRESS

DOD and DOE will produce 925 modernized nuclear projectiles.

[Deleted.]

Warheads produced after 19 October 1984 will be non-enhanced radiation version.

DOE production funds will be within $1.1B limit.

[Deleted.]

Note that this is a joint DOD and DOE plan. Given the conditions imposed by section 1635 of the law, it was determined that a mix of [deleted] projectiles makes the best use of the previous investment in the W79 program while simultaneously providing a reasonable program for DOE to adequately establish W82 production capability.

A mix of 155mm and 8-inch nuclear projectiles will permit use of the large numbers of 155mm Howitzer tubes, thus enhancing survivability and optimizing deterrence.

[Deleted] After General Rogers submits his nuclear requirements this spring, JCS, with service input, will reassess our ability to meet worldwide nuclear artillery requirements. Would like to briefly review the need for a modernized 155mm nuclear projectile

W48 STATUS

[Deleted.]

[Deleted.]

This slide shows the trend in the balance of delivery systems and warheads in Europe. It also depicts the consequences of no 155mm nuclear capability.

[Deleted.]

Today we are outnumbered in both delivery systems and warheads by the Warsaw Pact. The NATO disadvantage in nonstrategic nuclear forces is projected to continue to grow because of Soviet/Warsaw Pact expansion and Modernization. If the 155mm nuclear projectile is not replaced, note the overwhelming superiority the Warsaw Pact will have by 1990.

The FY86 DOD budget request includes $19.6M for continued RDT&E on the W82. The DOE budget seeks appropriation of $15M, authorized last year, to begin facility construction. This appropriation is critical to fielding the W82 in 1989. An additional request of $10M to complete the DOE facilities will be made in FY87.

Let me now cover the 8" AFAP, the W79. The W79 is currently in production. To date approximately [deleted].

In accordance with the 1985 DOD Authorization Act there will be no further ER production. The planned production of [deleted] DOD acquisition cost for this projectile is complete. Active US Army and USMC unit certification is also complete. Here again we don't know our total requirements until SACEUR requirements are received. [Deleted].

STATEMENT OF MAJ. GEN. ALEXANDER K. DAVIDSON, DEPUTY DIRECTOR FOR PLANS (DCS/PNO), HEADQUARTERS, U.S. AIR FORCE

General **Davidson**. Mr. Chairman and subcommittee members, it is a pleasure to appear before you today. I would like to applaud my colleague, General Davis', answer to my MX problems with his atomic artillery, but I am a little bit concerned about those significant numbers of strategic targets beyond [deleted] kilometers from the border of the Federal Republic. We still have to cover. We will keep working on that MX Program.

We greatly appreciate the opportunity to explain how essential we feel the Department of Energy's efforts are to the Air Force modernization programs. The Air Force and DOE and its predecessor agencies have had a close and continuing relationship for over 40 years.

While we do collaborate on nonnuclear matters, in many areas, the primary goal of our partnership is to provide safe, secure, and effective nuclear weapons for both our strategic and nonstrategic nuclear forces.

NUCLEAR WEAPONS REQUIREMENTS

This allows us to support the strategic modernization program, to meet our commitment to our allies, and to upgrade the overall safety and security of our weapon stockpiles.

Today I will describe——

Mr. **Stratton**. Does the Air Force have command of the Pershings and the——

General **Davidson**. No, sir, that is an Army weapon. GLCM's yes, Pershings no.

DOE PROGRAMS FOR THE AIR FORCE

Today I will describe the nuclear weapons of interest to the Air Force, DOE programs for the Air Force in fiscal year 1986 to continue our modernization. These are shown on this slide, and they are divided into three areas: Programs in development, SRAM II and small ICBM are in the study phase as to establish technical feasibility and cost tradeoffs of various warhead candidates.

The programs in production include B61-3 and -4 tactical bombs, B83 strategic bomb, and the warheads for both the air and ground-launched cruise missiles.

The B61-3 and -4 program is allowing the Air Force to replace late 1950 and early 1960 vintage tactical bombs with weapons having modern safety and [deleted] features. With these features, and Dr. Wagner mentioned several of them earlier, the weapons provide increased assurance against unauthorized use [deleted] including high terrorist threat areas.

In addition to enhanced safety, the B83 provides a high speed, low altitude delivery capability against the various hard targets in the strategic target base. Its [deleted] versatility will over time allow us in the Air Force to retire three older bomb types.

As the B83 becomes available in quantity, the [deleted] will eliminate the need to move weapons from base to base as assigned targets change.

The two programs in the third section, Stockpile Improvement Program, are the B28 and B61-1 bombs. The requirements exist for improved safety and [deleted] in existing weapons. The Air Force, in consultation with the DOE, looks at whether a stockpile improvement or a completely new weapon would provide the best solution. In these two cases, the stockpile improvement was selected.

NUCLEAR WEAPON MODERNIZATION PROGRAM

My final slide illustrates the fiscal year 1985 status and progress in our modernization efforts that will occur from the DOE fiscal year 1986 budget request. In the case of strategic and tactical bombs, the inventory objective is to modernize, not increase the existing stockpile, and in both of those cases the strategic and tactical bombs, the absolute levels, although I don't show the numbers, remains almost constant.

We have about [deleted] on each of those categories of weapons, and that will remain so for a significant period of time.

Although we are modernizing and improving the safety features of these weapons, both through modification of older bombs and in some cases completely replacing the weapons on a [deleted] to accomplish these modernization objectives, DOE produces new weapons as we retire old ones, maintains a healthy research and development program to hedge against continued Soviet advances, and tests weapons to insure continued stockpile reliability.

This requires efficient production and reclamation facilities, an adequate supply of special nuclear materials and a vigorous weapons research and development and test program.

With your past efforts, we have made progress in our modernization efforts. Your continuing support in fiscal year 1986 and beyond is essential to complete our efforts, and we ask that you favorably consider the Department of Energy budget request.

Sir, that completes my brief formal presentation.

Mr. STRATTON. You have zero percent for MX at the end of 1985. Don't we have some of the original [deleted] that were authorized in 1984? Aren't they under production?

General Davidson. No warheads and no operational Peacekeeper missiles will be delivered to the Air Force in fiscal year 1985. The [deleted] operational Peacekeeper missiles authorized in 1984 will be delivered to the Air Force in fiscal year 1986. The first warheads (W87) for the Peacekeeper will also be delivered in fiscal year 1986.

General Davidson. I don't think so, sir. There are [deleted] weapons in, that will be delivered in the fiscal year 1986 program, and I don't believe there are any included in the 1985 program.

Dr. Wagner. That is the warhead count.

General Davidson. You are talking about launchers, and these are strictly warheads, sir.

Mr. Stratton. Well, I am talking about the thing that we have fenced in. That is—we don't have any production that was prior to that fencing.

Mr. Scrivner. [Deleted.]

Mr. Stratton. Does that complete your presentation?

General Davidson. Yes, sir.

Dr. Mansfield. General Davidson, you mentioned that you were doing technical feasibility studies for small ICBM warheads. Can you tell us whether the existing constraints of size and weight, et cetera, imposed by the various people that have made technical parameter adjustments on that system, will have a severe effect on the ability to fit a good warhead in there?

General Davidson. I will have to take that question, Dr. Mansfield, but——

Dr. Mansfield. Let me make it more clear. Does the fact that the guidance system is very large in the small ICBM make it more and more difficult to put a good warhead in it?

General Davidson. I think any size constraints would make it more difficult, but I am not aware of any problems that we have come across so far that appear to be insurmountable.

Dr. Mansfield. Will you submit a statement for that on that subject for the record?

General Davidson. Yes, I will, and do you want to make a comment.

Dr. Wagner. I think we should just go with the Air Force's statement on that.

[The following information was received for the record:]

ICBM Guidance System

Does the fact that the guidance system is very large in the small ICBM make it more and more difficult to put a good warhead in it?

The final guidance system for the small ICBM has not been selected. A modified, lighter weight version of the Advanced Inertial Reference Sphere developed for the Peacekeeper mobile appears to be a leading contender, but technology development programs are proceeding to determine the feasibility of Ring Laser Gyroscopes and Stellar Inertial Measurement Units for use on the small ICBM. All of these units would be substantially smaller than present systems, although some of their components might remain the same size as present systems. Present weight and volume allocations for the small ICBM provide more than adequate parameters for both the guidance and control systems and the MK21 Reentry Vehicle (which houses the warhead.)

Prepared Statement of Maj. Gen. Alexander K. Davidson

Mr. Chairman and Subcommittee members, it is a pleasure to appear before you today. We greatly appreciate the opportunity to explain how essential the Department of Energy's efforts are to Air Force modernization programs. The Air Force and the Department of Energy, and its predecessor agencies, have had a close and continuing partnership for almost forty years. While we colaborate on non-nuclear matters, the primary goal of our partnership is to provide safe, secure, and effective nuclear weapons for our strategic and non-strategic nuclear forces. This allows us to support the Strategic Modernization Program, meet our commitments to the NATO allies and upgrade the overall safety and use control of our weapons stockpile.

NUCLEAR WEAPONS REQUIREMENTS

Support the President's Strategic Modernization Program.

Support NATO's dual track decision.

Improve wea~~pon safety and~~ use Control.

Today, I will describe the nuclear weapons of interest to the Air Force and their status.

Department of Energy programs for the Air Force in fiscal year 1986 continue our modernization efforts. These are shown on the slide and are divided into three areas.

FISCAL YEAR 1986 PROGRAMS FOR THE AIR FORCE

Programs	Purpose
Development:	
SRAM II	Completes studies to establish warhead technical feasibility and
Small ICBM	cost tradeoffs.
Production:	
B61-3, -4	Continues production to replace older [deleted] tactical bombs.
W80	Continues production of warheads for ALCM/ACM.
B83	Continues production to replace older [deleted] strategic bombs.
W84	Continues production of warheads for GLCM.
W87	Begins quantity production of warheads for Peacekeeper.
Stockpile improvement:	
B28	Continues [deleted] modification of a portion of B28 stockpile.
B61-1	Continues [deleted] modification of B61-1 stockpile.

Programs in development, SRAM II and Small ICBM, are in the study phase to establish technical feasibility and cost tradeoffs of various warhead candidates and features. Programs in production include B61-3 and -4 tactical bombs, B83 strategic bomb, and warheads for the Air and Ground Launched Cruise Missiles, Advanced Cruise Missile, and Peacekeeper.

The B61-3 and -4 production programs are allowing the Air Force to replace late 1950 and early 1960 vintage tactical bombs with weapons having modern safety and use control features. With these features, the weapons provide increased assurance against unauthorized use and decreased risk of plutonium scatter in all operating locations including high terrorist threat areas.

In addition to enhanced safety, the B83 provides improved high speed, low altitude delivery capability against the various hard targets in the strategic target base. It's [deleted] versatility will, over time, allow the Air Force to retire three older bomb types. As the B83 becomes available in quantity, the [deleted] will also eliminate the need to move weapons from base to base as assigned target[illegible]hange.

The two programs in stockpile improvement are the B28 and B[illegible]-1. When requirements exist for improved safety and [deleted] in existing weapons; the Air Force, in consultation with the DOE looks at whether a stockpile improvement or a new weapon provides the best solution. Stockpile improvement was selected for the B61-1 and th~~e B28~~.

This slide illustrates the fiscal year 1985 status and the progress in our modernization efforts that will occur from the DOE fiscal year 1986 budget request.

NUCLEAR WEAPON MODERNIZATION PROGRESS

	End FY 85	End FY 86
Weapons deliveries to Air Force as a percent of inventory objective:		
Strategic bombs	[Deleted]	[Deleted]
Tactical bombs		

NUCLEAR WEAPON MODERNiZATION PROGRESS—Continued

	End FY 85	End FY 86
Peacekeeper		
ALCM/ACM		
GLCM		
W25 (GENIE) [deleted]		
B53 [deleted]		

In the case of strategic and tactical bombs, the inventory objective is to modernize, [deleted] the existing stockpile. The Peacekeeper, ALCM/ACM, and GLCM provide new capabilities to counter the increased Soviet threat.

To accomplish these modernization objectives, DOE must produce new weapons as they retire old ones; maintain a healthy research and development program to hedge against continued Soviet military capabilities; and test weapons to insure continued stockpile reliability. This requires an efficient production and reclamation complex, an adequate supply of special nuclear materials and a vigorous weapons research, development, and test program.

With your past support, we have made progress in our modernization efforts. Your continuing support in fiscal year 1986 and beyond is essential to complete our efforts and we ask that you favorably consider the Department of Energy budget request.

Mr. STRATTON. Commodore, do you have a presentation to make?

STATEMENT OF COMMODORE ROGER F. BACON, DIRECTOR, STRATEGIC AND THEATER NUCLEAR WARFARE DIVISION, DEPARTMENT OF THE NAVY

Commodore BACON. Yes, sir.

Mr. Chairman, gentlemen and ladies. I am Commodore Roger Bacon, Director of the Strategic and Theater Nuclear Warfare Division in the Office of the Chief of Naval Operations. This division provides a focal point within the Navy to translate national nuclear policy into supporting Navy requirements and to assess how well our current and future systems, plans, and policies support our national objectives. For the past 20 months I have been Admiral Watkins' principal advisor on all policy and planning matters involving nuclear weapons, including arms limitation issues. I appreciate the opportunity to appear before this important subcommittee.

DOE PROGRAMS FOR THE NAVY

The Department of Energy budget, under consideration by this subcommittee, supports Navy requirements in strategic and nonstrategic warfare. The Navy strategic warhead requirements are dedicated solely to the strategic ballistic missile submarine force. The Navy nonstrategic warhead programs support requirements for strike warfare—ashore targets—antisubmarine warfare, antiair warfare, and Marine Corps battlefield weapons.

First, I would like to address Navy nonstrategic nuclear warhead requirements.

The Navy has embarked on a program to revitalize our nonstrategic nuclear warfare capabilities. This program was initiated in 1980 by the Chief of Naval Operations [CNO] because the deterrent value of existing Navy nonstrategic weapons had been eroded significantly by the growing Soviet nuclear threat. An example of this threat to our Navy is evident in the large number of air and submarine-launched antiship cruise missiles in the Soviet nuclear inventory. In spite of this threat, the Navy must meet its global commitments in support of the maritime strategy—the Navy element of national military strategy. The maritime strategy requires that U.S. naval forces operate in forward deployed regions, which include an ever present uncertainty of nuclear attacks on our fleet by Soviet land-based and at-sea forces.

The Navy theater nuclear warfare [TNW] modernization program is designed to remove any incentive for the Soviets to use their nuclear weapons at sea. This modernization program will allow the Navy—it requires hardening our ships and aircraft against the effects of nuclear weapons, such as blast, radiation, and electromagnetic pulse. It requires a comprehensive threater nuclear warfare training program. [Deleted.] are working hard in all of these areas.

It is not Navy policy to buy nuclear weapons automatically as replacements for systems being retired. We require a clear case for the utility of each weapon. Nuclear weapons should not serve as substitutes for conventional weapons where improved conventional weapons will suffice. We will procure only those nuclear weapons which provide a unique and substantial military capability. [Deleted.] The point is that the Navy nuclear weapons modernization program is well defined and integrated with the Navy's conventional capability.

TOMAHAWK MISSILE

One of the most significant developments in the Navy's nuclear weapons capability is the Tomahawk nuclear land attack cruise missile, or TLAM/N. Tomahawk is planned for SSN-637 and SSN-688 class attack submarines; DD-963 and DDG-51 class destroyers; CGN-9, 36, 38, and CG-47 class cruisers; and BB-61 class battleships.

These ship and submarine classes will be capable of carrying all Tomahawk variants in any desired mix. TLAM/N will greatly enhance the Navy's deterrence posture by distributing Navy offensive striking power across a large number of naval platforms. This will increase the number of Warsaw Pact targets that are put at risk [deleted]. Tomahawk complements the power of the carrier air wing and multiplies the effectiveness of the force at sea. TLAM/N will also provide additional survivable assets [deleted]. TLAM/N reached initial operational capability [IOC] in June 1984. At present [deleted] Navy ships and submarines are certified to carry TLAM/N. Within the next 5 years [deleted] TLAM/N missiles will be deployed in over 90 ships and submarines.

With the exception of the new nuclear Tomahawk cruise missile, the Navy has not deployed a new nonstrategic nuclear weapon since 1964. Most of the existing Navy nonstrategic nuclear weapons were designed in the 1950's, deployed in the early sixties [deleted].

The DOE budget being considered by this subcommittee also supports development of the W81 warhead for the nuclear version of the standard surface-to-air missile, SM-2(N). The requirement for this nuclear self-defense missile is very real. [Deleted.]

The SM-2(N) is a weapon for deterrence and has a unique, well-defined role [deleted]. It deters Soviet use of nuclear weapons at sea by increasing the probability that such an attack on the U.S. Fleet would fail. [Deleted.]

Another key warfare area is antisubmarine warfare [ASW]. Soviet submarine improvements include [deleted].

The Army has a valid requirement for the W79 and W82 warheads to modernize battlefield nuclear artillery. The Marine Corps also deploys with 8-inch and 155 MM artillery and must replace its equivalent aging, obsolete stockpile of W33 and W48 warheads. [deleted] I ask that this subcommittee recognize this important Marine requirement when evaluating the DOE budget for production of W79 and W82.

The last nonstrategic program that I will discuss is the B61 nuclear gravity bomb. The DOE budget supports the continued build of the new B61 MOD 3 and MOD 4 bombs which contain improved safety and security features. These new bombs will be allocated to the Air Force to modernize their bomb stockpile, but the Navy will benefit indirectly from this program. [Deleted.]

Through initiatives in nuclear survivability for our ships and aircraft, nuclear weapons modernization and training, the Navy is providing forces with the potency to deter a nuclear war at sea. The Department of Energy budget, under consideration by this subcommittee, supports Navy nonstrategic nuclear weapons modernization programs which are essential to the effectiveness of our fleet.

Let me shift now to strategic systems, which for the Navy means warhead requirements in support of submarine-launched ballistic missiles.

There are 19 Poseidon C-3 submarines, and each submarine carries 16 missiles. Each C-3 missile is loaded with [deleted] W68 warheads. The W68 building program is long completed; the last W68 was delivered to the Navy in 1975. DOE is, however, conducting a retrofit program for the W68 because these C-3 missiles will be used in Poseidon submarines through the 1990's. [Deleted] these warheads are being modernized with safety [deleted] modifications. The fiscal year 1986 DOE budget request includes funds to continue this retrofit program.

The [deleted] W76 warhead today supports the Trident I [C-4] missile. Twelve Poseidon SSBN's, originally designed to carry the C-3 missile, have been modified to carry 16 C-4's, each with a payload of [deleted] W-76 warheads. The first 8 Trident submarines, four of which are now making patrols, will each carry 24 C-4 missiles. [Deleted.]

The Trident II [D-5] missile is now in its second year of full-scale engineering development. DOE is developing the W88 high-yield warhead for this missile. With the combination of high accuracy and yield, the D-5 will provide our survivable, sea-based strategic force with greatly improved deterrent capability. D-5 will give us the capability to hold at risk the full spectrum of Soviet targets, including those [deleted] which the Soviets value most.

By the year 2000, when all of our older Poseidon submarines will have been retired, the Navy will have an SSBN force of about 20 Trident submarines, all carrying the Trident II D-5 missile. Beginning with the ninth Trident ship, all new construction ships will be equipped with the new D-5 missile. The first eight Tridents will be backfitted with the D-5 system during overhaul, beginning in the early 1990's.

The Trident II D-5 missile will carry either W-76 warheads. [Deleted.]

As Mrs. Holt mentioned, the synergism of our triad is most important. The overall modernization program is built upon the Scowcroft Commission's, findings, and includes the President's modernization of our MX, the small ICBM, the building of at least one Trident per year, the initial operational capability of the Trident II D-5 missile in December 1989, and the B-1 bomber. The modernization of our entire strategic nuclear forces is what is important.

All legs need the modernization, and I could not agree more fully with Mrs. Holt's comments on synergism of the entire triad.

During the past year, I conducted a study to determine if [deleted].

Before closing, I want to emphasize the continuing invulnerability of our ballistic missile submarines. After completing [deleted] strategic deterrent patrols [deleted]. All who are familiar with our security efforts agree with this assessment.

The situation is dynamic, and we must continue our vigorous efforts to ensure we remain ahead of the threat. This survivability of our strategic submarines equates to stability in a crisis. Since our SSBN's cannot be attacked successfully, no enemy is likely to initiate aggression when his attack cannot deny our capability to retaliate effectively. DOE's support of the Navy's strategic programs is most important to our Nation's deterrent capability.

Mr. Chairman, I have shown today the importance of the many programs which DOE is conducting for the Navy. The Navy's requirements are carefully considered and valid. We have initiated cost reduction measures where military requirements are not compromised. The Navy's nuclear warhead requirements are individually important to Navy missions and collectively support national security. These Navy requirements deserve your strong and continued support.

Mr. STRATTON. Thank you.

Could you just run over again, because I think I may have missed some of them, the nonstrategic nuclear weapons available to the Navy. You have a Tomahawk.

Commodore BACON. Tomahawk, the ASW standoff weapon which is a modernization program replacement for our Subroc.

Mr. STRATTON. Nuclear Subroc then, is that it?

Commodore BACON. Yes, with longer range and more capability so we can attack the [deleted] more capable Soviet submarines, [deleted].

Also, the SM-2N, our standard missile antiair warfare nuclear missile which would be used as a defense [deleted].

Mr. STRATTON. And a nuclear depth charge?

Commodore BACON. An improvement of our [deleted] nuclear depth charges.

Mr. STRATTON. And is there a nuclear torpedo?

Commodore BACON. [Deleted.]

Mr. STRATTON. Do the Russians have a nuclear torpedo?

Commodore BACON. [Deleted.]

Mr. RAY. Mr. Chairman?

Mr. STRATTON. Mr. Ray, yes.

Mr. RAY. Thank you, Mr. Chairman.

Dr. Wagner, gentlemen, good to have you today. This morning we talked a little about the protection of nuclear storage sites. I have been to some of these sites. I am not overly impressed with not only the inside site protection, but the exterior protection either. Do we have some plans to strengthen that?

Dr. WAGNER. Yes, sir; not as fast as I would like, but we are getting there. I have spent a fair amount of my personal time the last few years, maybe more in fact than I should have, on that subject. It comes in three parts. One is improving defenses in the lights and guard posts and so forth. That is a program almost complete. No more rusty fences, no more vulnerable guard posts. It will be finished in 1985.

The next thing, and I think the most effective thing in the next few years, is a system we call WADS, which stands for Weapons Access Delay System, which involves filling a bunker which is maybe the size of this end of the room with a bunch of devilish gadgets like concertina wire that drapes over the weapons and smoke which would fill the volume and barriers of various kinds so that it would be extremely difficult for anyone to remove a weapon. In tests U.S. Special Forces have played the part of terrorists and have tried to get into a bunker and take out a weapon when the bunker was protected that way.

[Deleted.]

The third program [deleted] would be a long-term program to essentially redo the whole storage posture and do it right, which we should have done 15 years ago, instead of having the weapons perhaps [deleted].

I would say most of that technology came out of Sandia Laboratories.

Mr. RAY. Also the Soviets have moved the SS-12 and 21's into the Warsaw countries. And have pretty well announced they are targetting our nuclear storage sites. Any comment?

Dr. WAGNER. Only that that is just one manifestation of moving their capability forward, improving it so they can target [deleted]. In addition to improving security, we are going to have to improve the survivability as well. Weapons [deleted] are also very survivable as well. So we will buy some survivability.

Mr. RAY. There has never been thought given to pouring defense into these sites?

Dr. WAGNER. Yes, in fact, there has been thought given along those lines. We are not planning on doing it, although with the Patriot system coming in, there will be someplaces where there is overlap of coverage.

Mr. RAY. One final question.

Dr. Wagner, you gave us a figure on SDI funding for DOE and DOD. I didn't get the final total amount.

Dr. WAGNER. The total is about, I think I added them wrong, now that I see the chart in my mind. It is $3.7 billion for DOD, and about $280 million for DOE. So that would be about, almost $4 billion for the total.

Mr. RAY. Thank you, sir.

Mrs. LLOYD. Mr. Chairman.

Mr. STRATTON. Mrs. Lloyd.

Mrs. LLOYD. I have one final question I wanted to ask Dr. Wagner. I didn't have my material until just now. Is that all right?

Mr. STRATTON. Sure.

Mrs. LLOYD. I am interested in some real arms control measures that would result in the reduction in the number of nuclear weapons. I am not interested in arms control as an end in itself. I think we should have learned that from experience, but I do think there are some proposals I have had brought to my attention, by reducing the weapons by converting the sensitive weapons grade plutonium to peaceful uses.

As I understand it, there are about 50,000 or 60,000 warheads between the Soviets and the United States. The President has suggested that the Super Powers could cut a third of the arsenal so that about 16,000 warheads would ultimately become available for conversion and use for commercial nuclear power plants.

I would like to have your assessment of this. Would this make a bilateral agreement possible? It is my understanding from the paper that I received that this could amount to about $5 billion in fuel that can be used in commercial benefit, whereas there is no benefit. It would mean a real true reduction.

The paper that I received states that a total of [deleted] equivalent material could be converted to peaceful purpose, a result of about $5 billion in savings.

Dr. WAGNER. If I could say that the President's proposals for deep reductions rather than simply freezing current levels——

Mrs. LLOYD. I am not advocating it. I wanted your opinion.

Dr. WAGNER. I believe truly the most important thing is the reductions. Not so much the economic benefit that would be gained from freeing up that material. Five billion is not a small sum, but compared to the leverage that one could get in national security from bilaterally reducing the weapons, I personally think that that is kind of a second order effect. It is not something we ought to throw away, but I don't think it frankly adds materially to the impetus for arms control.

We ought to do those cuts even if it cost a lot of money.

Mrs. LLOYD. You think that there is merit to this proposal, then?

Dr. WAGNER. I certainly think there is merit. I think that monitoring how the Soviets used their plutonium taken from dismantled weapons would be a rather difficult job. It is not clear to me that adding that requirement to the verification would make it harder to get an agreement rather than without that requirement.

Mrs. LLOYD. Thank you.

Mr. STRATTON. Any other questions? If not, thank you very much, Doctor, and gentlemen. We appreciate your taking the time and patience to answer some of our questions. I think we are all certainly very much concerned over the whole program. And that is responsible, I think, for our questions in such detail.

Thank you.

We had scheduled Major General Withers, the Deputy Assistant Secretary for Military Applications in the DOE. They are coming on tomorrow. We are going to have to squeeze in, I guess, a little more rapidly the testimony tomorrow because I believe that we have just about run out this afternoon.

So, if there are no other questions, the committee will stand adjourned until 10 o'clock tomorrow.

We have a visit from the Secretary of Defense of the United Kingdom that will go until 10:15, is that right? So we will stand adjourned until 10:15 tomorrow morning.

[Whereupon, at 4:20 p.m., the subcommittee adjourned, to reconvene at 10:15 a.m., Thursday, February 21, 1985.]

House of Representatives,
Committee on Armed Services,
Procurement and Military
Nuclear Systems Subcommittee,
Washington, DC, Thursday, February 21, 1985.

The subcommittee met, pursuant to call, at 10:15 a.m., in room 2337, Rayburn House Office Building, Hon. Samuel S. Stratton (chairman of the subcommittee) presiding.

Mr. Stratton. The subcommittee will come to order.

The members of the full committee met with the Defense Minister of Great Britain which lasted three-quarters of an hour, so we apologize for starting late.

I recognize the gentlewoman from Maryland.

Mrs. Holt. Thank you, Mr. Chairman.

Mr. Chairman, I move we close the hearing for national security reasons. We were granted authority on Wednesday, February 20.

Mr. Stratton. On the basis of the authority granted, the Chair will direct that the committee is in executive session, and anyone not cleared or qualified should leave the room.

Voice. The room is secured, Mr. Chairman.

Mr. Stratton. Thank you.

Our first witness this morning is the last witness that we weren't able to get to, General Withers, Deputy Assistant Secretary for Military Application in the Department of Energy.

General, we would be glad to have your testimony at this time.

STATEMENT OF MAJ. GEN. GEORGE K. WITHERS, DEPUTY ASSISTANT SECRETARY FOR MILITARY APPLICATION, DEPARTMENT OF ENERGY

General Withers. Thank you, sir.

With the committee's permission, I will submit my prepared statement for the record and summarize it with the help of some slides.

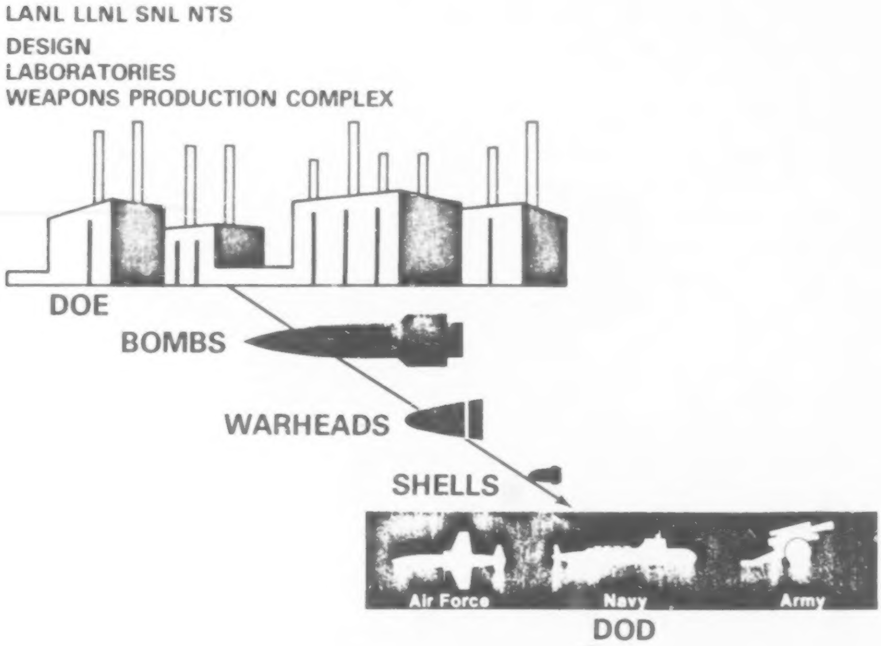
Mr. Stratton. Without objection, that will be ordered, yes.

WORKING RELATIONSHIPS

General Withers. Mr. Chairman, members of the committee, I am new to this business, having joined the nuclear weapons program 3 months ago. I am very happy and proud to be part of this program, and, as a newcomer, I have had some very strong initial impressions. Perhaps the strongest of those is the competence and dedication of the people in that program.

I am very happy to be a member of it.

I will discuss that part of the Defense programs' mission which has to do with research, development, testing, production, surveillance, and retirement of nuclear weapons.

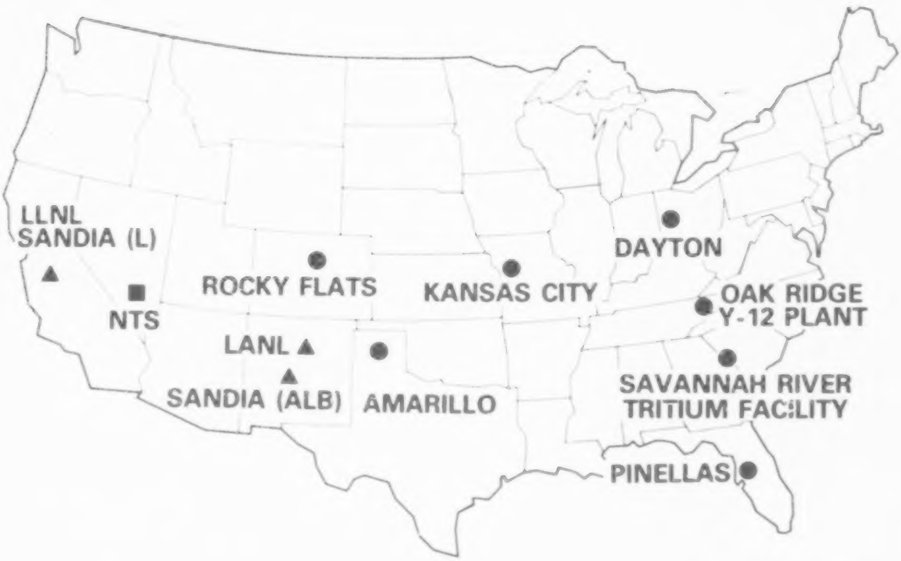

LANL LLNL SNL NTS
DESIGN
LABORATORIES
WEAPONS PRODUCTION COMPLEX
DOE
BOMBS
WARHEADS
SHELLS
Air Force
Navy
Army
DOD

This first viewgraph indicates that process and our relationship to the Department of Defense.

We have the three weapons design laboratories and the Nevada test site to design and test weapons which are then built in our weapons production facilities. These nuclear warheads are for the Department of Defense.

FACILITIES

NUCLEAR WEAPONS COMPLEX


LLNL
SANDIA (L)
NTS
ROCKY FLATS
KANSAS CITY
DAYTON
OAK RIDGE
Y-12 PLANT
LANL
SANDIA (ALB)
AMARILLO
SAVANNAH RIVER
TRITIUM FACILITY
PINELLAS

This map is similar to a slide you saw yesterday that General Hoover put on. It has fewer facilities on it because these are the ones that pertain to the mission that I described earlier.

This slide I showed to you indicated that there has been some reduction in the number of facilities over the last 20 years, and also to, I hope, make the point that we believe that the present facilities are the minimum needed to accomplish our mission.

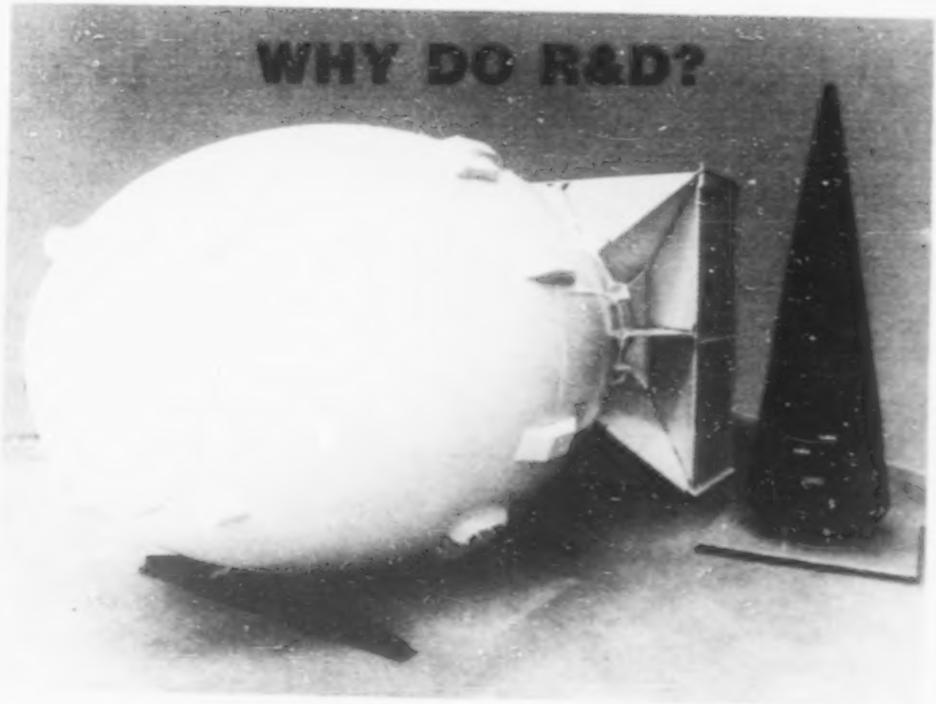
RESEARCH AND DEVELOPMENT

Sir, I use this slide to talk about research and development. The picture here is a replica of one of our 1945 bombs. It weighed 5 tons and had a yield of 13 kilotons.

On the right is a modern weapon which is representative of a modern reentry vehicle weighing 400 pounds [deleted].

Our point here is that in the last 40 years we have made significant improvements in weapon design, and that, of course, is one of the prime reasons for a vigorous R&D program.

We have done other things. We now have safer explosives. We have extended the lives of limited life components in weapons. We have made devices which were described yesterday by Dr. Wagner which are designed to prevent unauthorized use of the weapons.



Mr. STRATTON. Is that fat boy?

General WITHERS. Sir, that is Fat Man.

Mr. STRATTON. What is the actual dimension there, diameter?

General WITHERS. Five feet, sir.

Mr. STRATTON. And the reentry vehicle is similarly 5 feet?

General WITHERS. Yes, sir. It is about 5 feet long and about 1 foot in diameter at the base.

Mr. STRATTON. Go ahead.

SOVIET R&D CAPABILITIES

General WITHERS. Sir, I won't belabor this one. Dr. Wagner talked about this yesterday.

[Deleted.]

	United States	USSR
FISSION	1945	1949
THERMONUCLEAR	1952	1953
NEXT	?	?

General WITHERS. This is to indicate that we were ahead of the Soviets with the first fission weapon and ahead of them a little bit on the first thermonuclear weapon.

Yesterday, we discussed the future, and Dr. Wagner alluded to possible technologies with directed energy. I think the important point here is that we certainly don't wish the Soviets to arrive at that next stage, whatever it might be, before we do.

INVESTMENT STRATEGY

This is similar in some respects to the slide you saw yesterday that General Hoover presented. Our investment strategy includes meeting our production schedules and developing a capacity for some redundancy so that if we have a problem at a particular plant we are not stopped, and also having some capacity to move out quickly if we ever have to.

1984 ACCOMPLISHMENTS

In keeping with the investment strategy, I am happy to be able to say that we have made some significant accomplishments in the past year. We have met our production schedules and we have passed important research, development, and testing milestones.

The next point I will get into in a moment with some other slides.

Finally, we have completed eight major construction projects, including NOVA, the world's largest laser.

IMPROVED COST MANAGEMENT

We are interested in better cost management and are spending a good deal of time on it. There are several aspects to improving our cost management and efficiency to produce weapons.

One of them is in having modern equipment. This slide, which shows a computer-operated measuring device, saves many man-hours.

This slide is to indicate a bright idea. We have had a number of them which I will mention a little further.

[Deleted.]

We are now able to recycle the scrap, and this has resulted in a savings, or cost avoidance, at least, of $16 million.

Cost savings—Production plant and one time savings

	Million
Rocky Flats	$20.5
Y-12	31.8
Bendix	83.7
Mound	1.9
Pinellas	1.3

This is a listing of a recent review of cost savings at a number of our production plants. You can see that we have, on a one-time basis, avoided a significant number of costs. There is also a recurring cost savings inherent to these items of about $2 million a year.

NEW COST MANAGEMENT IMPROVEMENT

We have formalized a process in which we are improving the way we look at weapon system costs. Very early in the weapon design process, we are formalizing military characteristics and making baseline cost estimates. We have also started a component unit cost reporting system to track actual costs in phases 5 and 6—all contributing to better review and control of weapon life-cycle costs.

Mr. STRATTON. I don't quite get what the thrust of your testimony is. You have just got this list of charts up here and all. You have saved a buck here and you have saved a buck there. I don't think that is what we really are trying to get in this hearing.

General WITHERS. Sir, I will move on.

Mr. STRATTON. I thought we wanted to find out what your proposals were and how we were going to fund them and how we are going to get some money for inertial confinement fusion.

General WITHERS. Sir, I will move on to that.

SPECIAL TOPICS

There are a few topics that I wanted to mention. One is radiation litigation.

The Department of Energy is very appreciative of the amendment to last year's defense authorization bill which provides that the contractors who work for the Department of Energy cannot be sued in connection with radiation claims.

The second item is the inertial fusion program review. There has been an agreement reached and a panel constituted which will review the inertial fusion program. Their meeting at the National Academy of Sciences will take place in 2 weeks.

I will return to inertial fusion a little bit later.

Artillery-fired atomic projectile production was covered adequately yesterday.

I wish to discuss building 371 at Rocky Flats because that facility, which was designed, among other things, to recover plutonium and recycle it, has not worked as designed.

We are reviewing that situation now to ensure that whatever we recommend as a solution to this problem will be a solution that will work. We anticipate making proposals to you with the fiscal year 1987 or 1988 budget.

1986 BUDGET REQUEST

I would like to now talk about the budget we are proposing. The 2 percent figure mentioned yesterday is the real programmatic growth when one takes away the projected effects of inflation and the requirements for safeguards and security, environment, and the like.

Mrs. HOLT. Mr. Chairman, may I ask a question?

Mr. STRATTON. Yes, Mrs. Holt.

BUILDING 371

Mrs. HOLT. What do you mean the building doesn't work? I know that you are saying it doesn't operate at full efficiency, but explain it a little bit more.

General WITHERS. The facility was intended to recycle plutonium scrap and waste. It also has decontamination and cleaning functions which work fine, but the part which has to do with recycling the plutonium through an aqueous chemical process does not work as intended.

There are a great many problems which prevent it from working. We were pushing the state-of-the-art in the 1970's when it was designed and built. It is a real problem. There is no dodging that.

Mrs. HOLT. It was a design error in not recognizing it?

General WITHERS. I think it is probably fair to say it was a design error among other things. It is rather complex. I am not prepared to fully explain it now.

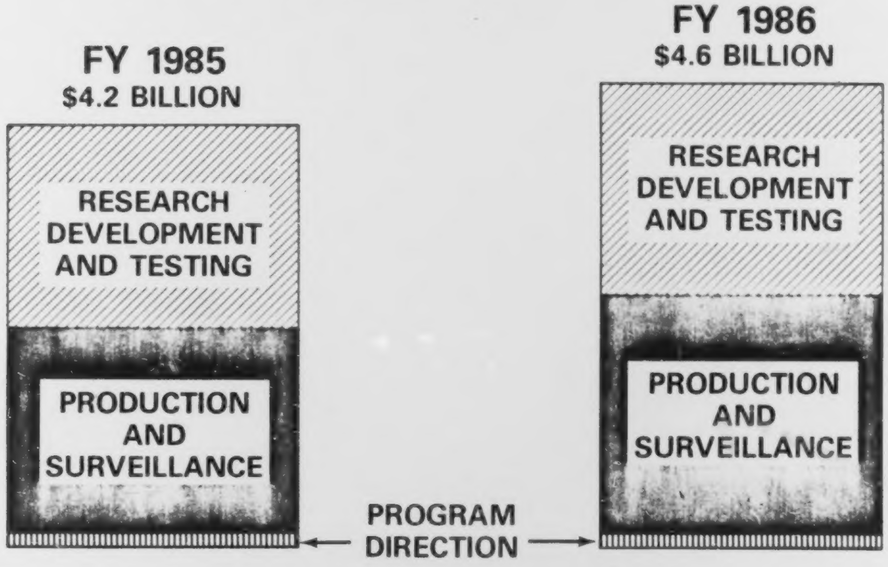
Mrs. HOLT. All right.

Thank you.

General WITHERS. We are still analyzing the problem.

Mrs. HOLT. It just doesn't work. OK, I will accept that.

General WITHERS. Yes, ma'am.



FY 1986 WEAPONS BUDGET

Our proposed budget for fiscal year 1986 is $4.6 billion.

Mr. STRATTON. How are you recycling this if the facility at Rocky Flats doesn't do the job?

General WITHERS. There are some parts of the facility which are operating for certain types of plutonium scrap. Other plutonium scrap is being recycled at Los Alamos and Savannah River.

NUCLEAR MATERIALS SUPPLY

Mr. STRATTON. [Deleted.]

General WITHERS. Sir, I don't think there is a quick answer to that. [Deleted.]

Mr. STRATTON. That isn't a very precise statement. I don't know what that means

General WITHERS. At the moment, we have enough plutonium and uranium for the weapons which we are scheduled to build.

Mr. STRATTON. [Deleted.]

General WITHERS. I haven't seen that, sir.

Mr. STRATTON. Well, I mean, you are supposed to be the experts. What is the status of plutonium? What is the status of uranium?

General WITHERS. Sir, I am not the expert on that.

Mr. STRATTON. My understanding was one of the pieces of legislation that the other body enacted at the urging of the Senator from Colorado makes it extremely difficult for us to maintain the level of plutonium we want because we are not allowed to reprocess spent fuel from commercial nuclear energy plants to extract weapons-grade plutonium.

Mr. HOOVER. Sir, I am General Hoover.

Let me attempt to answer your question. You will be getting an indepth review of our materials program in another session. As I indicated yesterday, we have had sufficient plutonium to meet our weapons production goals. [Deleted.]

We are meeting our production goals right now and we have plans and programs that will allow us to continue to meet those goals. [Deleted.]

With regard to enriched uranium, as you know, we have a basic stockpile of enriched uranium which we have not added to now for several years. [Deleted.] That is a matter of dollars. The plan to do that is essentially achievable if we fund for it.

Mr. **STRATTON**. What have you done to try to get rid of that legislation that prevents you from utilizing the results of rods that have been used in the production of electricity?

Mr. **HOOVER**. We have not undertaken any action to attempt to acquire weapons grade plutonium from civilian sources, sir. That has not been——

Mr. **STRATTON**. But you say you are operating on a hand-to-mouth basis. That isn't a very good procedure for a general officer, is it, to be operating his forces on a hand-to-mouth basis?

Mr. **HOOVER**. It is not as comfortable a situation as we would like it to be, sir, but there are budgetary constraints and——

Mr. **STRATTON**. Well, it isn't a budgetary restraint. It is a legal restraint, isn't it?

Mr. **HOOVER**. Well, legal restraint with regard to the use of reactor material generated from civilian sources, yes. That is a political call.

Mr. **STRATTON**. If the law is wrong, then we ought to change it, shouldn't we? Shouldn't somebody speak up from the Department that has the primary responsibility? If Congress doesn't give you enough M-1 tanks to handle the situation in Europe, you don't say, "Well, that is a legal restraint. We can't do it." You raise a little hell and say, "We have got to have something."

But in this case, we sit idly by, it seems to me.

Mr. **HOOVER**. Well, sir, I think that as long as we can continue to meet our production goals and there is not an emergency situation such that we would lose our existing production reactors, I don't think we have a compelling case to request a change in the law.

Mr. **STRATTON**. Well, I think—I don't know what you mean by "hand-to-mouth". I think we ought to get a specific report on exactly where we stand and how close we are to zero, and make some recommendations about it.

Mr. **HOOVER**. Yes, sir.

Mr. **STRATTON**. Rather than just leave it with that designation.

Mr. **HOOVER**. We would be happy to provide that information, sir.

[The information requested is classified and is retained in subcommittee files.]

FISCAL YEAR 1986 BUDGET

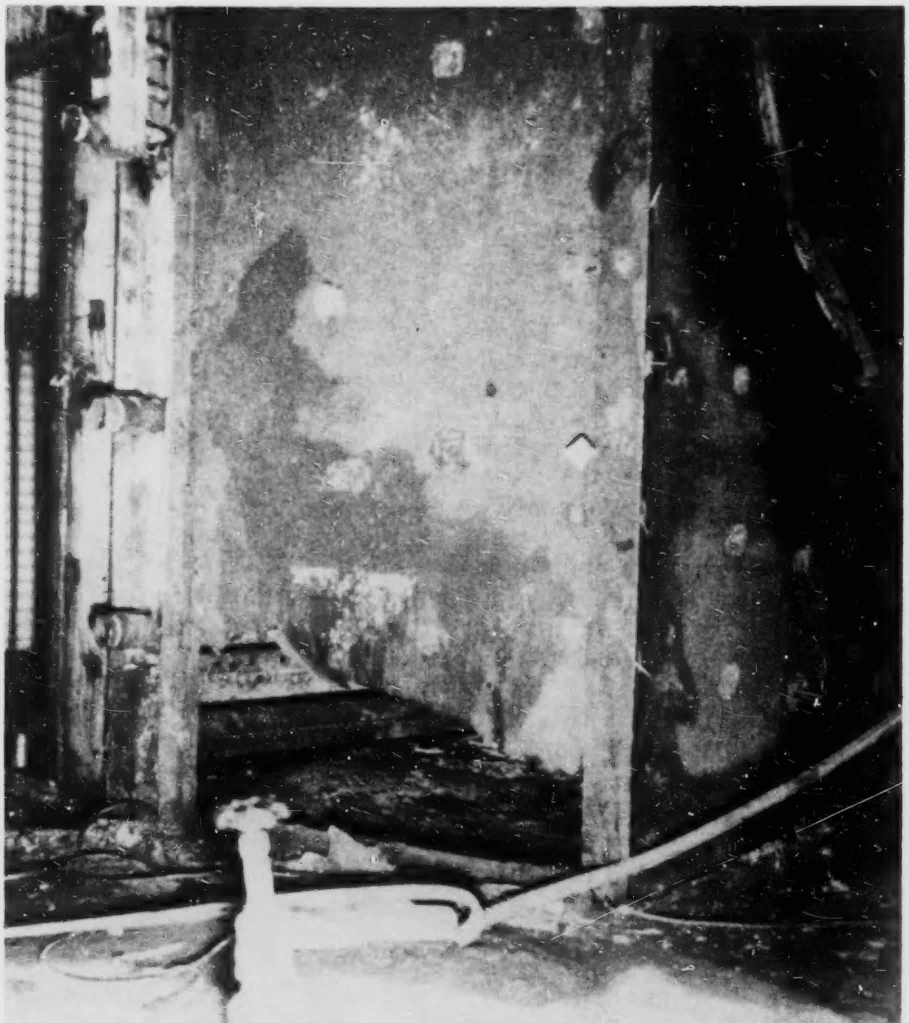
General **WITHERS**. Sir, our program is broken into three decision units. [Chart.] This is the production and surveillance part which takes care of actual weapons production and deliveries.

FISCAL YEAR 1986 PRODUCTION AND SURVEILLANCE BUDGET

[In millions of dollars]

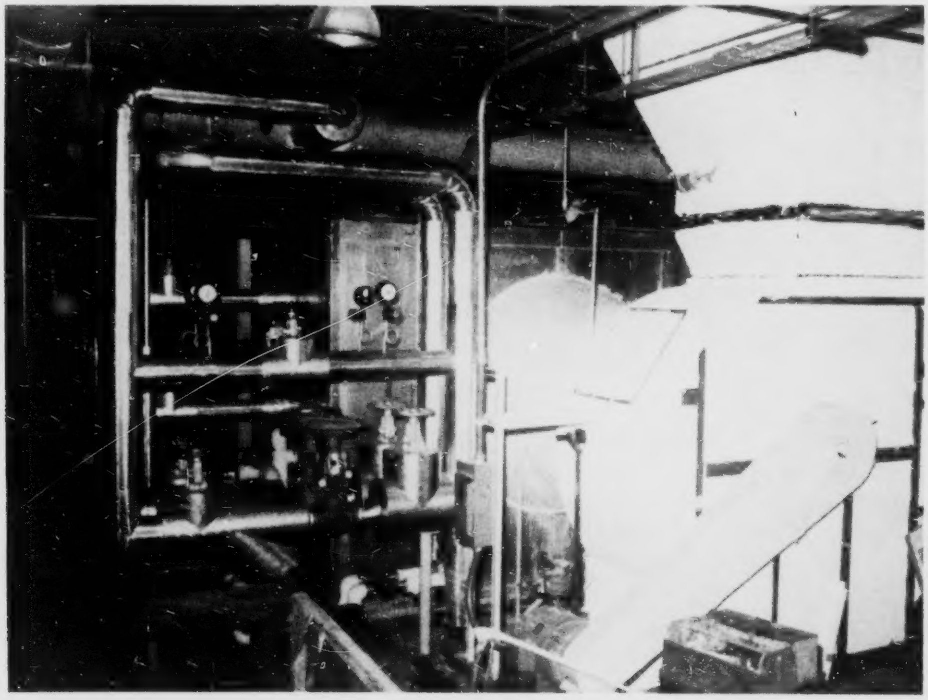
	Fiscal year—	
	1985	1986
Operating expenses	$1,806	$1,942
Capital equipment	119	136
Construction	398	548
Total	2,323	2,626

The black workload line indicates, among other things, the increasing sophistication and complexity of weapons—it takes considerably more manhours today to build a weapon to get it through the door, than it did 10 years ago.



RESTORATION AND REVITALIZATION

Also, as part of our request, we plan to continue efforts to improve facilities which have deteriorated such as this utility system at Y-12. Thanks to your support of the restoration program, the HVAC system has been replaced and is now safe, reliable, and economical.



The next part of the budget request has to do with research, development, and testing.

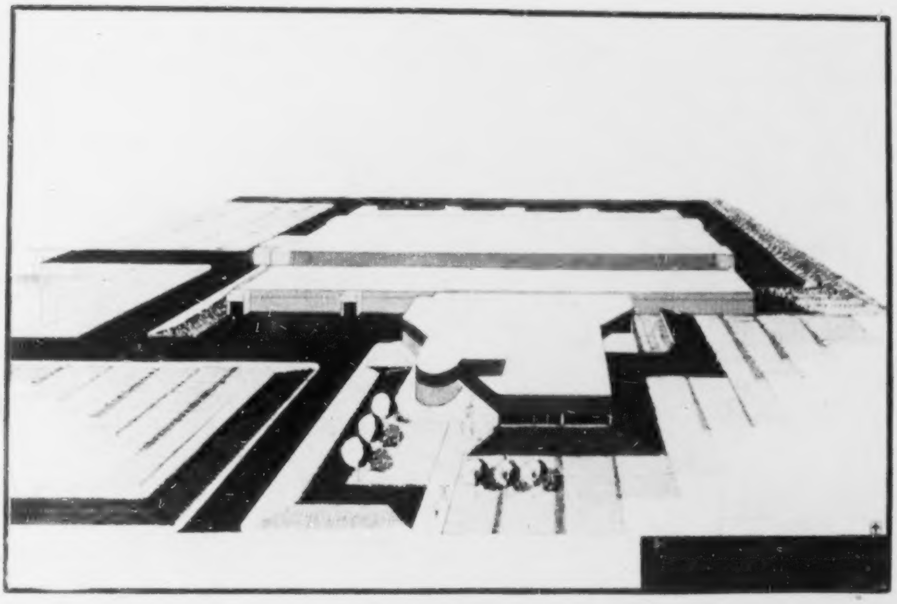
Those are the figures.

Along with supporting all of the research, development, and testing at the laboratories and the Nevada test site, this budget also supports facilities such as this. These are at the test site. They have existed for years and have been inadequate.

The interior looks like this.

With your help and support of the RDT&E revitalization effort we now have improved the living conditions there. They are not palatial, but they are much more livable.

Process Development Lab-SNLA



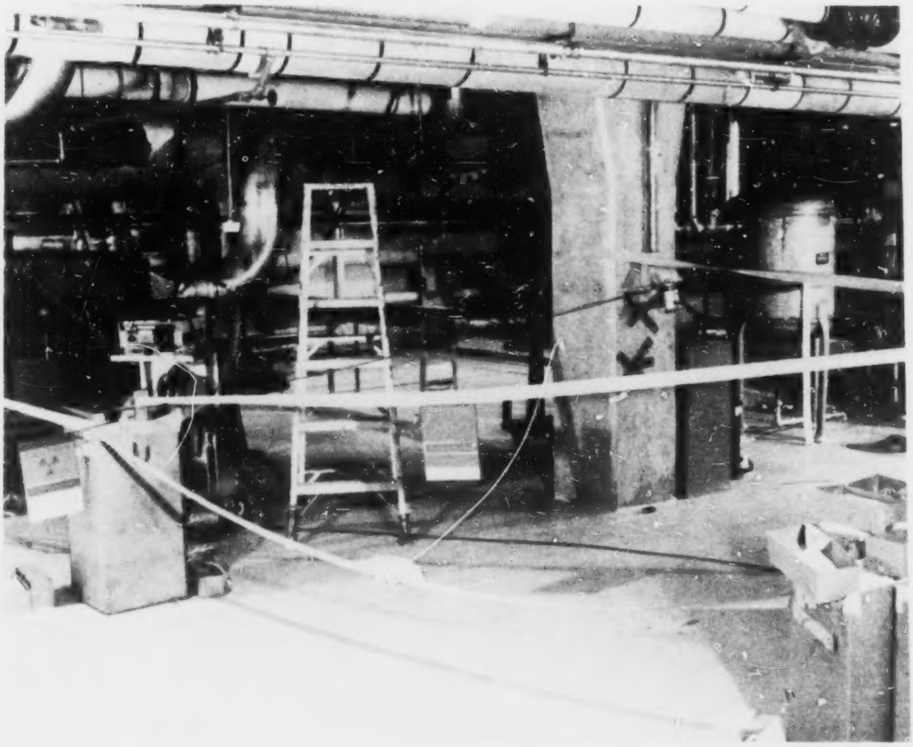
Proposed

But a laboratory is under construction which consolidates the functions and adds new capability. It will look like that upon completion.

Process Development Lab-SNLA

Current

This is the current process development lab at Sandia.



We are making great strides with revitalization, but there is more to do. This is the current chemical and metallurgical research laboratory at Los Alamos, where basement spaces are used as part of the laboratory.

As you can see in the slide, there are safety problems—radioactive leaks, problems of every nature—which must be addressed in the near future.

Mr. STRATTON. Does that come out of Milcon?

General WITHERS. No, sir. This is a laboratory facility. The research, development, and testing part of our budget pays for these facilities.

Mr. STRATTON. The building of facilities just as you have demonstrated there, that isn't research and testing, is it?

General WITHERS. We must fund R&D facilities with part of that money.

FISCAL YEAR 1986 RESEARCH, DEVELOPMENT AND TESTING BUDGET

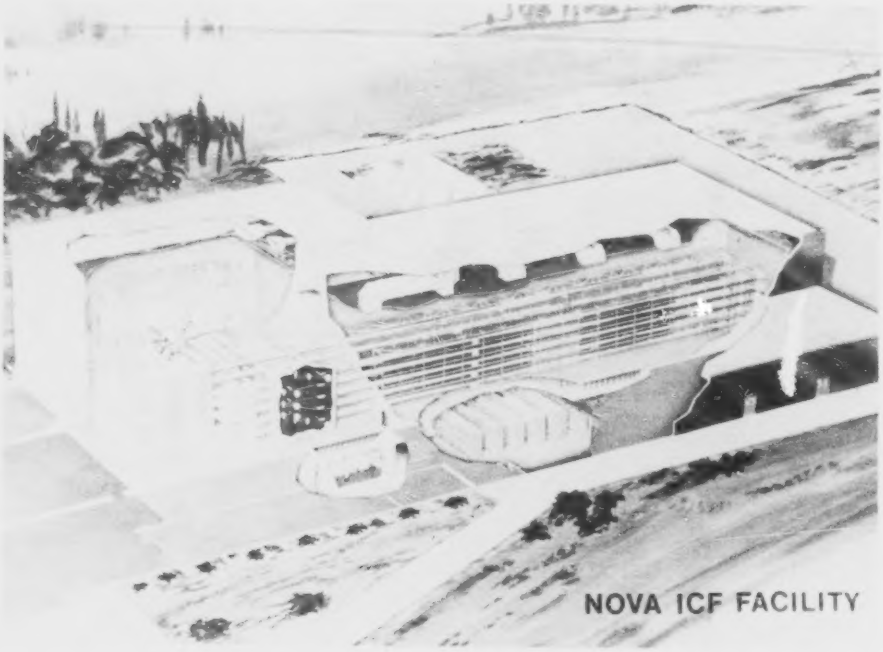
[In millions of dollars]

	Fiscal year	
	1985	1986
Operating expenses	$1,483	$1,464
Capital equipment	133	141
Construction	194	263
Total	1,810	1,868

To go back, as you see, Mr. Chairman, the construction line on this chart is for construction of facilities. The chart also shows the amounts for capital equipment and operating expenses.

Mr. STRATTON. That is not tied in with the military construction budget, then?

General WITHERS. No, sir.



INERTIAL FUSION PROGRAM

I would like now to talk about inertial fusion.

We have, as you know, proposed in this budget to bring the inertial fusion program into the RD&T program so that weapons research priorities are made within the overall context of the weapons program. We have, as you know, reduced the funding level of the inertial fusion program.

Mrs. HOLT. Mr. Chairman, could I ask a question at this point?

Mr. STRATTON. Mrs. Holt, yes.

Mrs. HOLT. The DOE has changed the status of the program now, as you just said. And it has become, it seems to me, just another program under the Office of Military Application. The DOE support seems to have completely disappeared for this program now, just leaving OMB in charge of it.

Would somebody—General Hoover or you—address the management problems in the defense programs, and what can we do to rectify the situation? It seems to me that now we are making good progress. This committee has been struggling for years with this program, trying to keep it moving. And now we are just throwing a bunch of money out there.

For instance, you say you have reduced the budget. Why did you cut Livermore by 67 percent and KMS by 60 percent, and the University of Rochester is not cut at all? Sandia is cut by only 25 percent. It just seems to me that there is no management there at all. Why couldn't the money be allocated between the laboratories? What are we doing?

Mr. HOOVER. Well, first of all, we recognize that the inertial fusion program continues to contribute in an important sense to our weapons application activities. It also retains the potential as an energy source. There has also been some concern about funding an energy application out of defense programs. As you are aware, because of the nature of this technology, it is not really possible to separate the physics involved. I will not try to convince you that reducing the program as far as it has been reduced makes good management sense or good technical sense. We were faced with some budget priorities. We believed that by combining the effort of this program with the funding that is available in the broader research and development part of our program, that it would achieve its own level. We will use research and development funds for inertial fusion efforts as they make sense in terms of application to weapon physics.

Even though we made the allocations you just mentioned, for example, I fully believe that Lawrence Livermore will recommend to us that out of their total research, development, and inertial fusion budget they will devote a greater amount of funds than the number that you just quoted.

That capability is not available at the University of Rochester or the other supporting contractors. They don't have this additional base. So we had to fund them at a level more commensurate with sustaining the effort.

Mrs. HOLT. Just one more, then I will yield to you.

What you are saying, then, is it is not the progress of technology that has caused this to happen. You are moving ahead with it.

I have been hearing for the 12 years that I have been around here that, "Well, we can't do anything until the year 2000, so why put any money in it right now?" To me, that is not what research and development is all about.

So you are not saying that you can't make progress.

Mr. HOOVER. I believe it certainly still has potential for energy application. We can see direct application today in terms of assisting us in weapons research. We have had some very useful experiments that have been conducted with regard to an x-ray laser. So we can see payoff there.

As I said, we frankly were in a budget priority situation. We tried to make the best of a situation which, from a technical sense, perhaps——

Mrs. HOLT. Are you counting on us to take care of it this year?

Mr. HOOVER. Yes, ma'am.

Mrs. BYRON. Mr. Chairman, may I follow up on that point?

Mr. STRATTON. Mrs. Byron.

Mrs. BYRON. General, in your opening statement, one of your slides you put up, you said we have completed NOVA with great pride. Yet, looking at the budgetary request, what initially—they were zeroed out for the program which would have now completed

NOVA and then had to shut it down. That is a program that I think we have looked at with great pride.

I think we are the only show in town in that area. Then, yet, looking at the initial budget request, that program was going to have to be closed down.

In the 1984 authorization, which I think is about October 1983, the committee requested an in-depth review, and you testified a few minutes ago that that review is going to begin, the panel has taken it up, in about 2 weeks. Isn't that an awfully long time when Congress had requested something over almost 2 years ago, or a year and a half ago, to get around to getting that panel to do their work?

Following that a little bit farther, going back, because it all ties in with the ICF program, tying that in with the funding for NOVA, which has now been cut fairly dramatically, with a reduction, this program concerns me very greatly because I don't think we are getting the answers to the questions we need here to make our decisions.

These are programs that have been budgeted, programs that we have supported, programs we have had funded, and getting a little bit off base, but 3 and 4 years ago, we were hearing that it was very difficult for the labs to recruit young talented scientists. We were not finding those positions in the schools placed with American students, or they were filled, the spots, many of them, with foreign nationals.

We have turned that around. We are now beginning to pull in young, attractive, aggressive, eager scientists into our programs at Lawrence Livermore, into the programs at Los Alamos, into the programs at Sandia.

Now, when we are getting to the advanced and the exciting programs, we get the programs developed, now we are beginning at the top to cut off the programs right when you are beginning to draw in new research scientists to those programs.

How are we going to be able to continue the cycle if we get an advancement of a program, we get people that work day and night to get something such as NOVA on line, we bring it on line, we get industry to fund the usage of it on a shared basis, and then we cut it down. That doesn't make too much sense to me.

Would you give me just some answers on that?

General WITHERS. First, I anticipate that we are going to be operating NOVA. As General Hoover said, "I think there is going to be more to be said about that between us and Livermore."

Second, I can't answer your question about the delay. I am not aware of that. I know that the panel is meeting in early March, on the 4th, 5th, and 6th, and then they will get started.

Mrs. BYRON. But it has been a year and a half since Congress had requested it. I think what I am trying to tell you is that Congress has asked and requested answers back from not only this area, but numerous areas. And I think the mood up here now is that when Congress requests and asks for a review of something, when it asks for a test of something, then I think we better get our acts together. Otherwise we will not be funding programs until we get those answers.

INERTIAL FUSION STUDY

Mr. **Hoover**. Perhaps I can address the issue of the study. That was raised during our hearing last year, and subsequently incorporated in the legislation. I wholeheartedly subscribe to the need for such a study. We collectively need the basis, the advice of informed scientists as to the pace of this program and the merit of this program.

We have had extended deliberations with staff and the Congress, with the Office of Science and Technology Policy, and with our office, to try to come to an agreed slate of scientific investigators. That turned out to not be an easy task, because, you know, there are differing views among these offices.

I believe we have a slate that at least now has the kind of balance on it where all of the interested concerns, including, perhaps, the military application aspect, are now represented.

I sorely wish we had the results of that study going into the budget process, which in our department started last summer. I share your frustration for it taking so long.

Mrs. **Byron**. Now, it is going to start in 2 weeks. How long is the panel going to take to review? Six months, a year?

General **Withers**. An interim report is scheduled for completion this year and the final report is due the following summer.

Mrs. **Byron**. By that time, the whole scenario will have changed and what we will be reviewing is a 4-year review of something that was requested four years ago.

Mr. **Hoover**. We agree that we would like that to happen at a faster pace. I certainly would like to have a better basis to address this issue within my department as we go into the next budget cycle. We will pressure the panel, if we can, to give us the kind of information that will be useful.

Mrs. **Byron**. Well, we spent $176 million to complete NOVA. And we are talking about now cutting it back.

Mr. **Hoover**. There is a question of pace, I agree.

Mr. **Stratton**. Who is responsible for this panel?

Mr. **Hoover**. It is being done by the National Academy of Sciences, I believe.

Mr. **Mavroules**. Mr. Chairman.

Mr. **Stratton**. Mr. Mavroules.

Mr. **Mavroules**. Maybe while you are contemplating a question, I could ask something altogether different here. Probably we might have some testimony on it later.

Mr. **Stratton**. Go ahead.

SAFEGUARDS AND SECURITY

Mr. **Mavroules**. On occasion, I become a little critical on nuclear weapons, period, as I have a little hangup with that on occasion, but I am positive you all do a very good job and I want you to know that: something that is needed.

The thing that disturbs me, perhaps you can answer for me. I appreciate the fact that you are improving the quality of life as you demonstrated on some of your charts. Are we raising the level of security around these areas? I had the opportunity, which was very meaningful to me, to visit Sandia and Los Alamos and Livermore. And I guess I have become a nut on security.

Do we raise the level of security? Do you have enough funds to guarantee the security of the plants themselves?

General WITHERS. Sir, you are going to get more on that by Mr. Cook later, but I can say from my visiting sites recently and my impressions of the program that the answer is absolutely yes. The people on the sites are proud of their new security improvements and show them off with great pride.

I would say we have done a lot of things that are obvious to me, a newcomer, that have greatly improved the situation.

Mr. MAVROULES. Let me ask this question: Do you lack funds for those purposes? Do you have enough funds?

Mr. HOOVER. I think our funding level is healthy and within what we need to do the job at this time.

Mr. MAVROULES. I thank you.

Mr. COURTER. Mr. Chairman.

Mr. STRATTON. Mr. Courter.

Mr. COURTER. Thank you, Mr. Chairman.

My question is somewhat off the discussion also, but it is, I think, an important one. I have been reading your testimony with the red cover, the classified version of your testimony. I find it not unusual, but usually confusing in the sense that all these numbers are in narrative form. It is just impossible for me to get a handle on what your budget, your line items are by reading something in narrative form.

Have you prepared something we can look at? The purpose of these hearings is to go over funding levels, budgets, recommendations, and authorization for the various areas of responsibility, programs, areas of research and development, security, SDI, what you are spending on inertial fusion, et cetera, but it is in narrative form. I can't follow it. I am having a terrible time. I read the whole thing and I am no better educated now than before.

What will help us is if there are charts with numbers in columns so we can add them up, find out the growth, find out the real growth or nonreal growth in specific areas. Did you do that, or are we just getting this in this form?

Mr. HOOVER. It depends on what aggregate you want to break that out, sir. What you have is, in fact, a summary. There are detailed budget briefing books prepared and provided to your staff which are in any amount of detail I think you would want to go into.

Mr. COURTER. We have been provided with those?

Mr. HOOVER. Yes; and for the purposes of the relatively short time that we have before you, we try to present just a broad abstract of a larger aggregate of what we are doing. For example, on the budget for strategic defense initiative, which you mentioned, $282 million is associated with that, up from $210 million last year, but to get down into the level of detail as to what that is would take considerably more time than we have at these hearings.

Mr. COURTER. Then maybe the information, in my mind, the graphic, the chart information should accompany the testimony. I am not necessarily looking for more information. I am looking for this information in digestible form, and I have great difficulty getting a feel as to where you are going, what budget requests are based on functions, by reading this. Maybe if I was as thoroughly familiar as you are with these, it would make sense. I read it, and I have no idea what your spending levels are in relationship to inflation, what your real growth is in various function levels, where reduction in authorization requests are this year over last year by looking at this narrative.

Mr. **Hoover**. Yes. We tried to provide you some of those growth trends in my testimony yesterday on real growth and taxes on the program, but I agree it is very difficult for you to get the kind of detail you are talking about from what is really a cursory and summary presentation of a very large program.

General **Withers**. Sir, my final three viewgraphs, if I may.

RESEARCH AND DEVELOPMENT LABORATORY EMPLOYMENT

	Fiscal year	
	1985	1986
Research and development	8,150	8,400
Inertial fusion	1,450	700
Total	9,600	9,100

R&D LABORATORY EMPLOYMENT

This is to indicate that we are following a strategy which includes an increase in research and development full-time equivalents. However, as you can see in the total, there is actually a decline because of the inclusion of the inertial fusion program.

Fiscal year 1986 program direction budget

[In millions of dollars]

Federal salaries and support services	$49.9
Community assistance:	
Los Alamos	7.7
Oak Ridge buyout	41.1
Total	98.7

PROGRAM DIRECTION

The final part of my portion of the budget has to do with program direction, the salaries for federal employees and community assistance for Los Alamos and Oak Ridge. The $41 million figure for the Oak Ridge buyout is to take care of all future obligations for community assistance to that area.

Mrs. **Lloyd**. Mr. Chairman.

Mr. **Stratton**. Yes, Mrs. Lloyd.

OAK RIDGE COMMUNITY ASSISTANCE

Mrs. **Lloyd**. On the Oak Ridge buyout, I don't believe that has been agreed upon at this time with the community; or that it does conclude all remaining obligations. That is a matter we are working on, but I would like to bring to your attention that I am having a meeting this afternoon and meeting this weekend with the community officials in Oak Ridge, but at the present time the city of Oak Ridge and the two counties have not agreed to this sum.

So I would like to hold that in abeyance if we could.

General WITHERS. All right.

Mrs. LLOYD. Thank you.

Thank you, Mr. Chairman.

FISCAL YEAR 1986 BUDGET HIGHLIGHTS

General WITHERS. Finally, the highlights of my portion of the 1986 budget. It does support the President's nuclear weapon stockpile memorandum. It does, as I indicated, provide 8,400 full-time equivalents in research and development, and maintains the testing level. It supports prior year projects, two new programmatic construction projects, and the other things shown on this slide.

Mr. Chairman, members of the committee, that ends my summary of my testimony.

Mr. STRATTON. Thank you, General.

PREPARED STATEMENT OF MAJ. GEN. GEORGE K. WITHERS, JR.

It is my pleasure to appear before you today to discuss the President's request for the Department of Energy (DOE) weapons activities program. This is my first appearance as the Deputy Assistant Secretary for Military Application. I have a number of issues to discuss with you, in addition to the explanation of our budget estimates, but first I would like to present a little of the history of what we are doing, and how we got to where we are today.

OVERVIEW

Starting with makeshift laboratories and borrowed equipment at the Los Alamos National Laboratory, our predecessors conceived, built and tested the first atomic bombs—the weapons which ended World War II. From this beginning with the Manhattan Project, the Atomic Energy Act was passed, and on January 1, 1947, the weapons program was established. The Act placed the research, development, testing and production of nuclear weapons under civilian control in the Atomic Energy Commission. Our mission requires that we:

Direct a program of research, development, testing, production, life-time surveillance, and retirement of nuclear weapons.

Direct a program for the prevention of unauthorized nuclear detonations.

Maintain liaison between the DOE and the Department of Defense on nuclear weapons matters.

Administer DOE activities under international agreements for cooperation involving nuclear weapons.

From those beginnings 40 years ago, much has changed in the nuclear weapons program. Today's weapons complex little resembles what we started with 40 years ago—except for the tradition of excellence in meeting our mission goals.

The DOE and its predecessors have been successful in satisfying the singular mission placed upon us. Our national security demands a preeminent level of excellence in scientific innovation and in the production of nuclear weapons to the highest standards of safety, reliability and performance. Scientists, engineers, skilled production workers and managers work closely together to maintain the integrity of the weapons program through the life cycle of each weapon. Decentralized management through government owned, contractor operated laboratories and weapons and materials production facilities provides advanced technology capability not duplicated elsewhere. The three weapons laboratories provide independent judgments, innovative development, design competition and views and insights not available anywhere else in this nation.

WEAPONS COMPLEX FACILITIES

When this program was organized under the Atomic Energy Act nearly 40 years ago, there were three facilities in the nuclear weapons complex: Los Alamos Scientific Laboratory, where we conducted research; a Sandia branch of Los Alamos located in Albuquerque, for ordnance design, development and testing; and the Rock Island Arsenal, which produced the mechanical bomb components.

By the mid-1960's, the weapons complex had reached its peak as far as numbers of facilities were concerned. One of the great strengths of the program was already in place—the government-owned, contractor-operated facilities that I mentioned earlier. Our three nuclear weapons laboratories, Los Alamos, Lawrence Livermore and Sandia, are truly national assets; they have developed some of the finest technical facilities in the world, and bring together the best scientific and technical talent in the nation to work on the challenging national defense problems we face. Our production plants provide a unique capability—manufacturing high technology nuclear weapon components to exacting specifications, using uncommon materials, and responding to requirements which, by their nature, push the limits of manufacturing technology.

Today's nuclear weapons complex has fewer facilities than 20 years ago. Since 1964, we have eliminated most of the redundancy in the complex—which has saved us a great deal of money but which leaves us vulnerable if a single facility or production capability within a facility should be shut down for any reason. The nuclear weapons complex of today represents the minimum required to meet our national nuclear weapons requirement.

CHANGING TECHNOLOGY

As much as the weapons complex has changed, so has the product. During World War II, our largest conventional bombs were 5 to 10 ton block-busters with a few tons of high explosive (HE) equivalence. The nuclear bombs dropped on Japan—forty years ago this August—weighed approximately the same, but gave nearly 20,000 tons of high explosive output.

Today, we are developing the W88 warhead for the TRIDENT II MK5 reentry vehicle which will have a yield of [deleted] in a weight substantially less than 500 pounds. Tremendously significant scientific and engineering achievements, rooted our research and development efforts, made these changes possible. We have made major improvements in yield to volume ratios; better packaging; safer explosives; extended life components, and use control features.

But our adversaries have not been standing still either.

SOVIET MILITARY CAPABILITY

[Deleted.] The bottom line is that we cannot take chances in this area. We must support a vigorous R&D effort in our national nuclear weapon laboratories. We must maintain our production capabilities.

INVESTMENT STRATEGY

We have an investment strategy for the DOE nuclear weapons complex that seeks to accomplish these goals. To successfully accomplish our mission now and in the future, and to ensure that the complex will remain strong and viable, we must provide sufficient manufacturing capacity to meet current and planned production workload with some backup capability. We must enhance our capability at our national laboratories, maintain an effective stockpile improvement program, employ modern management and manufacturing techniques to increase productivity, and restore and revitalize the physical plant—all with adequate safeguards and security and environmental protection.

As in previous years, the budget request for FY 1986 has been developed in the framework of this investment strategy. This is a lean budget. It represents a responsible balance between current requirements and investments for the future, and the need to control Federal spending wherever possible. The budget request before the Committee is the product of extensive analysis, arduous debate, and difficult choices. It takes into account initiatives that we have undertaken throughout the complex to better manage the resources we have, and to increase our efficiency and productivity. It represents the minimum resources required to do our job in FY 1986.

Before I turn to the specifics of the budget request, I would like to highlight some accomplishments, and discuss several special topics.

ACCOMPLISHMENTS

During the past year, we have:

Achieved all assigned nuclear weapon production, retrofit and retirement objectives.

Instituted additional programs in the laboratories and production plants to reduce costs and improve operating efficiency.

Initiated major management improvements to more effectively develop, report, manage and control weapon system costs.

Participated in planning for and conducted 10 emergency response exercises.

Continued cooperative activities with the United Kingdom (U.K.), [deleted].

Completed the DOE Plan to support the Strategic Defense Initiative.

Completed Phase 1 studies for the Small Intercontinental Ballistic Missile and Short Range Attack Missile II weapon systems; completed Phase 2 studies of the Nuclear Depth Bomb for the Anti-Submarine Warhead; initiated Phase 3 Engineering Development of the W88 warhead/MK 5 reentry body for the TRIDENT II.

Maintained an active underground nuclear test program at the Nevada Test Site, successfully conducting [deleted] test events.

Demonstrated soft x-ray lasers using the NOVETTE laser system.

Completed eight major construction projects, including the world's most powerful laser, NOVA, at the Lawrence Livermore National Laboratory.

We are particularly proud of two specific accomplishments in the areas of operating efficiency and cost management.

Increased efficiency

The DOE has a strong commitment to reduce costs and improve efficiency throughout the weapons complex. As you know, our Government-Owned Contractor-Operated plants are operated by companies with a long history of successful ownership and operation of their own commercial plants. Cost control and efficiency are important to their commercial operations; these companies apply the same management techniques to the operation of our plants. Nevertheless, we are emphasizing the need for improved cost saving and improved operating efficiencies, and require quarterly reports of cost savings and initiatives from each of our plants. Three examples follow.

Efforts at the Rocky Flats Plant to recycle scrap generated in the manufacture of the aft and center caps of the W80-0 and W80-1 warheads has reduced material requirements, and reduced the per unit cost by [deleted] each; this will result in a savings of about $16 million over the life of these two systems.

The Martin Marietta Corporation and Sandia National Laboratories developed a new process that made more efficient use of a very expensive steel alloy in the B83 bomb. This new process will result in a savings of about $14 million over the life of the B83 bomb program.

Rockwell International installed an automated production scheduling system at Rocky Flats which improves material flow. This system reduced work-in-process inventories by about $16 million.

We have many other initiatives underway including computer integrated manufacturing, acquisition of state-of-the-art capital equipment, and refinement of manufacturing processes to decrease workload costs. All of these efforts taken together will lead to our goal of reducing costs and improving efficiency.

Improved cost management

Recent increases in some weapon systems unit costs have shown the need to reemphasize cost management in nuclear weapons design and production activities. We have undertaken an aggressive program to improve cost management in the following areas:

An improved and more formal documentation of military characteristics and stockpile-to-target sequences, and establishment of baseline cost estimates for each weapon system.

A component unit cost reporting system that will provide an analysis of the change in unit cost estimates and a comparison of actual cost performance. This information will form the basis for a more structured review and analysis of weapon system production programs.

A more thorough and comprehensive review of weapon system life-cycle costs provided to the Congress to support the DOE and DOD budget submissions.

The overall objective of the initiative is to have an improved system to develop, manage, and control weapon system costs more effectively.

SPECIAL TOPICS

Radiation litigation

The Department very much appreciates the action taken by the Congress last year in enacting Section 1631 of the DOD Authorization Act, concerning Radiation Litigation. By providing that the U.S. will be the sole defendant in all pending and future atomic-test cases, Section 1631 recognizes that the contractors involved in the atomic weapons testing program were engaged in unique and clearly governmental activities that made them instruments of national policy. It is only fair that the Federal Government be the party against which any lawsuits involving such activity be brought.

Inertial fusion program review

General consensus has been reached among DOE, the Office of Science and Technology Policy, the Office of Management and Budget, and the Congress on procedures for organizing and conducting the Inertial Fusion program review mandated by the FY 1985 Authorization Act. The review will be carried out by the National Academy of Sciences, and general agreement has been reached on the charter, chairman, and membership of the technical review committee. We anticipate that the report of the review group will be useful to the Department and the Congress in determining the future direction of the program.

Artillery fired atomic projectile [AFAP] production

Section 1635 of the FY 1985 Defense Authorization Act pertains to the modernization of AFAPs. On February 5, 1985, the Secretary of Defense submitted the DOD plan to implement those requirements. The plan calls for the production of a mix of modernized AFAPs not to exceed 925 units. The planned build will produce approximately [deleted] W79 8-inch AFAPs and approximately [deleted] W82 155mm AFAPs. Warheads [deleted] produced after October 19, 1984, the date of enactment of the DOD Authorization Act, will be [deleted] as specified in Section 1635. It is now planned that W79 production will be completed in FY 1986. [Deleted.] The total DOE acquisition costs to be expended for both warheads from October 19, 1984, are estimated to be [deleted] within the $1.1 billion limit included in Section 1635. Costs for maintaining the weapons in the stockpile are estimated to total $1.07 billion over the life of the systems.

With respect to the W82 production program, we have notified the Congress of our intention to initiate product and process engineering and long lead procurements to support the [deleted] initial operational capability for the W82 and included $15.0 million in the FY 1986 budget to finance the construction of production facilities.

[Deleted.] The total estimated cost of the W82 production facilities has been reduced to $40.0 million—$15.0 million appropriated in prior years, $15.0 million requested in FY 1986, and the remaining $10.0 million to be requested in FY 1987.

[Deleted.]

Building 371 at Rocky Flats

In 1969, a major fire at the Rocky Flats Plant destroyed most of the plant's plutonium recovery capabilities. In 1982, we completed a new plutonium recovery facility, Building 371, which replaced and enhanced this capability. However, operating experience with the facility has shown that plutonium processing and scrap recovery results do not meet design specifications. Because future plutonium needs are projected to increase, and because DOE desires to minimize or eliminate offsite shipment of plutonium-bearing residue, Building 371 must operate at full efficiency. We have initiated a study of options to address the problem, and the study group's recommendations are expected later this year. Funding for correction of Building 371 deficiencies will be requested in FY 1987 or FY 1988.

I will turn now to a discussion of the FY 1986 budget estimates.

FISCAL YEAR 1986 BUDGET REQUEST

The Departmental request for the weapons activities program totals approximately $4.6 billion in new budget authority, an overall increase, including inflation, of about 9 percent above FY 1985 appropriations. This provides for essential effort required to support the research, development, testing, production, and lifetime surveillance of safe and reliable nuclear weapons to meet national defense needs. Inertial fusion research is also included. No supplemental FY 1985 funding is requested.

The budget request is discussed in detail below.

Production and surveillance

The major portion of the budget request—over $2.6 billion—is provided to produce, maintain, and certify nuclear weapons throughout their lifetime, then to disassemble and dispose of them all in accordance with Presidential direction in response to the Nuclear Weapons Stockpile Memorandum. These Production and Surveillance activities are carried out at seven government-owned, contractor-operated plants throughout the United States that provide for fabrication and assembly of nuclear weapons and weapon components, stockpile maintenance, reliability assessment of the existing stockpile, procurement of non-nuclear materials, and development of processes and techniques required for projected weapon production.

The FY 1986 budget request for Production and Surveillance supports the currently anticipated production schedule. Operating expenses account for $1.94 billion of the budget request, an increase of about $136 million, or about 7.5 percent, over FY 1985. This will support production and delivery of eight weapon types for current stockpile requirements in FY 1986; preproduction activities on the W81, W82, W88 and Antisubmarine Warfare/Standoff Weapon Warhead (ASW/SOW); and provide for maintenance of the existing stockpile. In FY 1986, the following systems will be in production: the B61-3 and B61-4 bombs, which have been in production for a number of years; the W76 TRIDENT MK-4 warhead, [deleted] the W79 warhead for the 8-inch Artillery fired Atomic Projectile; the W80-0 Sea Launched and W80-1 Air Launched Cruise Missiles; the B83 bomb; the W84 warhead for the Ground Launched Cruise Missile; the W85 warhead for the PERSHING II missile, and the W87 warhead for the PEACEKEEPER missile. As discussed earlier, the W79 is in production now, although at a rate lower than previously planned. This production program will be completed in FY 1986 to permit the restart of the W82 program, consistent with the guidance contained in the FY 1985 authorization act.

Funding for capital equipment and general plant projects is increased by about 16 percent to $170 million to slow further deterioration of the capital asset base in the weapons production complex. Capital equipment funds are also provided in support of the Computer Integrated Manufacturing (CIM) initiative underway throughout the complex.

Of the $2.6 billion requested for Production and Surveillance, about $500 million is planned for construction. New projects include the ASW/SOW production facilities at various sites, safeguards and security upgrades, environmental improvements, and a production support project at the Savannah River Plant. The remaining construction funding is required to continue prior-year projects, including two major utility improvement projects in progress at the Pantex Plant.

I would also like to discuss the Utility and Equipment Restoration program, which was begun in FY 1980. As you recall, this program was initiated to redress a decade of underfunding that resulted in the deterioration of the capital assets of the weapons complex.

The initial schedule for completion of the work was set at five years. This schedule was predicated on a specific funding profile to eliminate the existing backlog, and adequate funding for general plant projects (GPP) and capital equipment to halt further deterioration of the capital asset base. Constrained budgets have stretched the initial five year schedule to the currently projected nine year schedule. The total cost of the restoration line item has increased to approximately $1.3 billion in FY 1986 dollars.

We are requesting $480 million to continue the Restoration effort in FY 1986. About $195 million of this total is included in the P&S construction request for the Utility and Equipment Restoration line item, to continue the major construction projects. The overall restoration effort also includes approximately $285 million in basic capital equipment and minor general plant project construction efforts funded in the P&S and RD&T requests. This will cover the annual growth in the inventory of "poor and inadequate" facilities—an inventory which, if unchecked, will accumulate and extend the Restoration program.

Research, development, and testing [RD&T]

The research, development and testing budget supports the activities of the three nuclear weapons laboratories and the Nevada Test Site in RD&T, engineering and certification of stockpiled and future nuclear warheads, and the advancement of science and technologies applicable to nuclear weapons. The budget request for research, development and testing includes funding to support laboratory employment and [deleted] underground tests. The Department's efforts in support of the President's Strategic Defense Initiative (SDI) are included in the Research and Development Technology Base activities, and will be discussed separately.

Operating expenses of about $1.5 billion are requested for FY 1986, about half of which is expected to be devoted to technology base activities. Because the Inertial Fusion program is included in the RD&T activities for FY 1986, the funding for technology base activities has actually decreased by about $20 million from the FY 1985 level, with a corresponding decrease in laboratory employment of about 500 full-time equivalents to just over 9,000 in FY 1986.

The technology base provides the fundamental scientific and engineering data bases and facility capabilities for exploration of advanced concepts, supporting research and supporting technologies. During the last several years, new concepts have emerged from the nuclear weapons technology base; its vitality is extremely important to ensure that our stockpile does not become obsolete, and to guard against technological breakthroughs by our adversaries that could possibly degrade our stockpile's deterrent value.

Other aspects of the research, development, and testing program include inertial fusion research and research in support of the Strategic Defense Initiative.

Significant technical achievements in recent years have led to inertial fusion research and development activities becoming an important part of the technology base for nuclear weapon design and advanced weapon concepts. With the DOD's increasing demands for nuclear weapon development and for proof of advanced concepts, we have found it necessary to review priorities within overall weapons research and development. This committee has indicated to my predecessors that the major facilities developed for inertial fusion should be utilized to the extent possible in addressing nuclear weapon design issues, many of which are also inertial confinement fusion feasibility questions, as well as issues of advanced concept feasibility. We intend to use these facilities to support weapons research to the extent permitted by available resources. Out of total weapons technology base funding of about $730 million, we plan to continue our present inertial fusion research and development activities at a level of about $70 million in FY 1986, a decrease from $154.8 in FY 1985. Within this constrained funding we intend also to [deleted] continue the supporting laboratories' efforts.

Underground nuclear testing is an integral part of the overall research and development process. A total authorization request of $677.6 million supports a balanced program [deleted] weapon tests that will address basic weapon design physics, development of specific designs for DOD systems, [deleted].

Capital equipment funding for RD&T is requested at $141.5 million, an increase of about 6 percent. The request includes planned increases in capital expenditures for state-of-the-art supercomputers required in all aspects of weapon design. We are attempting to acquire these critically needed machines in the most cost-effective manner.

The FY 1986 RD&T construction authorization request includes $29.9 million for general plant projects, $112.1 million for the continuation of prior-year revitalization projects, $104.3 million for the continuation of five safeguards and security prior-year projects, $25.8 million to continue two other prior-year projects, and $9.0 million to initiate design of two new projects.

The Strategic Defense Facility, to be located at Sandia, will provide needed new capabilities to conduct experimental research on advanced defensive and directed energy weapons concepts. The new Decontamination and Waste Treatment Facility at Lawrence Livermore National Laboratory address important environmental, safety and health issues.

In FY 1984, we initiated, with your help, a multi-year capital investment effort to provide new or additional capabilities to revitalize the nuclear weapons research, development and testing complex. The RD&T Revitalization program will replace or add to existing facilities that are outdated, deteriorated, overcrowded, or otherwise inadequate to provide the capabilities required to support a vigorous research, development and testing program over the long term. So far, $86.4 million has been appropriated for these projects, and the total cost to complete the program is currently estimated at $1.9 billion over the next 10 years. Funding requested in FY 1986 for the RD&T Revitalization effort totals $96.5 million. This is to continue ongoing projects only—new starts in FY 1986 have been deferred due to budget constraints.

Strategic defense initiative

The DOE role in the Strategic Defense Initiative is one of support to the DOD. The SDI-related research, like all of the weapons research and development activities, will be in support of goals set by the DOD. To this end, we have negotiated a memorandum of agreement with the DOD in which we make a commitment to conduct a coordinated, responsive research effort in support of overall SDI program objectives.

The DOE's SDI-related research is carried out primarily in the technology base portion of the weapons research and development program. [Deleted.] These efforts are principally research on nuclear directed energy weapon concepts, carried out at the three national laboratories. [Deleted.]

The level of effort for DOE's SDI-related research in FY 1986 is expected to total about $282 million. [Deleted.]

Program direction

The Weapons Program Direction request provides funding to support Headquarters and field personnel engaged in general management and direction of the weapons complex, as well as funding for the Community Assistance Program for Los Alamos, New Mexico and Oak Ridge, Tennessee. For FY 1986, the authorization request includes $49.9 million for personnel costs, and $48.8 million for Community Assistance. Of the amount requested for Community Assistance, a lump sum payment in the amount of $41.1 million will liquidate all remaining obligations to Oak Ridge under the Atomic Energy Community Act of 1955. This will provide for an equitable conclusion of the program in Tennessee and will assist the City of Oak Ridge, and Anderson and Roane counties in attaining the financial independence for which they have been striving since the inception of the Act.

Finally, I would like to discuss several other issues which cut across program lines. There are two major efforts underway in the nuclear weapons complex to address important aspects of the way we conduct our business. These are (1) Safeguards and Security and (2) Environment, Safety, and Health. We must assure that our facilities are safe, secure and environmentally acceptable.

Safeguards and Security

As you recall from our testimony last year, we have undertaken a substantial effort to assure that the weapons complex has an adequate defense against possible acts of theft, diversion, sabotage, terrorism, and other acts which could interrupt the workings of the nuclear weapons complex or endanger our citizens. We are striving to attain a posture that will preclude intrusion on any of our sites. We are devoting considerable resources in FY 1985 to expand our guard forces further, improve training, and provide better equipment and facilities to enhance protection capabilities based on each site's requirements. We plan to continue these efforts in FY 1986.

The FY 1986 authorization request for safeguards and security construction at weapons complex sites is $126.5 million. This will permit the initiation of two new construction projects—one at the Pantex Plant and the other at the Mound Plant, totaling $4.5 million, with the balance of the FY 1986 request of $122.0 million continuing nine prior-year construction projects at various weapons complex sites.

The largest portion of the request for prior-year projects is $45.4 million for the Combined Device Assembly Facility at the NTS. This funding will initiate the construction phase of this important project. The project provides a 124,000 square foot facility within a 50-acre, high security area in a central portion of the NTS. The purpose of the facility is to consolidate all DOE nuclear test device assembly functions in a safe and secure facility which meets current standards for assembly of nuclear materials and high-explosive operations.

Environment, safety and health [ES&H]

A related initiative is also underway for ES&H issues. Emphasis on environmental protection requirements by Federal, State and Local agencies has increased substantially in the past few years. Earlier environmental protection standards have been tightened. Previously acceptable methods for storage and disposal of waste products are no longer acceptable. We must take a responsible approach to compliance with the new standards—one which balances the best methods of hazardous materials disposal with adequate protection for our employees and our neighbors. We are developing long range plans to address these problems, and we are setting priorities to accomplish our goals in a balanced, cost-effective manner.

The authorization request is $31.2 million in construction funding for ES&H activities to continue two major ES&H projects currently in progress and begin design and construction on three new projects, one in Research and Development and two in Production and Surveillance.

Before I summarize, I would like to address one additional topic which has become very important to us in the Department's Weapons Activities program.

BLUE RIBBON TASK GROUP

In the FY 1985 Defense Authorization Act, the Congress requested that the President establish a Blue Ribbon Task Group to examine the procedures used in establishing requirements and providing resources for the nuclear weapons program, and to recommend any needed changes in such procedures. The Task Group was initiated because of concerns that DOE-produced weapons were "free" to the DOD without consideration of resources and tradeoffs; that conventional weapons are not given due consideration; and that nuclear weapons tend to be overly complex and costly.

These concerns should be considered by the Task Group.

The President is to provide a detailed plan to your committee on the composition and conduct of the Blue Ribbon Task Group. The Task Group is to forward a report to the President and the Congress that will contain findings and recommendations in the following areas:

Ways to improve coordination between the DOE and Department of Defense to ensure cost-effective implementation of weapon activities and materials production.

Cost effective improvements that can be made in budgeting and management procedures that affect weapons activities and materials production.

Whether DOD should assume the responsibility for funding current DOE weapon activities and materials production programs.

Previous studies on this subject essentially substantiated the central thrust of the Atomic Energy Act. Chief among these were the 1976 Funding and Management Alternatives for ERDA Military Application and Restricted Data Functions study, commonly referred to as the "Transfer Study", and the July 1980 Long Range Nuclear Weapon Planning Analysis, called the "Starbird Study". Each study affirmed the quality of the laboratories and production complex, and recognized the uniqueness of the program. At the same time, however, the studies recommended actions for strengthening the acquisition and funding process. The Blue Ribbon Task Group provides another opportunity to examine new approaches and different methods of reviewing resources necessary for developing nuclear weapons.

The integrated and independent DOE nuclear weapons enterprise has shown singular competence in responding to the nation's vital defense requirements. Any changes which may be proposed by the Blue Ribbon Task Group must be carefully examined to ensure that they do not dilute the existing strengths of the nation's nuclear weapons enterprise.

Over a 40-year period, this enterprise has:

Successfully provided this country's ultimate defense—its nuclear deterrence.

Provided the highest level of scientific innovation, which has resulted in the U.S. lead in nuclear weapons technology.

Maintained a high level of confidence in the safety and reliability of nuclear weapons.

Had the flexibility to respond quickly to new requirements.

This record is a result of strengths within the enterprise, strengths which include:

Independent, creative design laboratories.

Competent government-owned contractor-operated production facilities, capable of technological performance not found elsewhere in U.S. industry.

A decentralized yet integrated system, in which design laboratories, production facilities, and government management work closely together to achieve their common purpose.

Independent views and approaches to weapons design and nuclear safety.

We will increase our cost and resource tradeoff interactions with DOD on the basis of procedural changes recently initiated but not yet brought to fruition. We will continue to improve internal management techniques for cost effective utilization of resources.

SUMMARY

In closing, Mr. Chairman, I would like to emphasize that our budget as presented to you today is lean. It supports the DOE-DOD plan proposed to the President in the Nuclear Weapon Stockpile Memorandum. It continues the Restoration program, to preserve our capital assets. It includes small increases for GPP and capital equipment to slow deterioration, and it supports our commitment to an appropriate level of safeguards and security and environmental protection at our sites.

Due to overall Federal budget constraints, however, the budget provides for only two new starts for programmatic facilities and includes no new RD&T revitalization projects. Our requests for capital equipment and GPP are less than we would like—or need—to really stop the deterioration of the capital asset base. There are increased demands on our R&D Technology Base funding, but yet there is a net decrease in laboratory manpower. We also expect that the weapons program will have to absorb a greater percentage of laboratory overhead due to significant reductions in DOE's energy programs.

Notwithstanding all of this, we remain upbeat. The nuclear weapons program has combined the best attributes of American industry, academia, and government to accomplish singular program objectives with unparalleled excellence. The weapons program will continue to strive for excellence, look for new ideas, and improve its operations. We will continue to seek new and creative approaches to resolve issues while, at the same time, preserving and maintaining the strengths of the present program. We accept this challenge.

Thank you for the opportunity to speak with you today. I would be happy to answer any questions you may have concerning the Department's Weapons Activities program.

[The following questions were submitted for the record:]

STATUS OF NUCLEAR WARHEAD PRODUCTION

Mr. **Stratton**. What is the current status of nuclear warhead production for the PEACEKEEPER missile and for the TRIDENT II?

General **Withers**. Activities involving production engineering on the W87 PEACEKEEPER warhead are progressing well. No major technical problems have been encountered. In FY 1986, [deleted] W87 warheads are scheduled for delivery. The DOE expects to achieve the initial operational capability (IOC) quantity on schedule.

The DOE has commenced engineering development of the W88 TRIDENT II warhead consistent with meeting the current IOC schedule. No deliveries are planned until FY 1989.

PRODUCTION STATUS

Mr. **Stratton**. What is the current production status of the W79?

General **Withers**. As of October 1, 1984, we had produced [deleted] W79 8-inch warheads. [Deleted.] This fiscal year, we will produce [deleted] additional warheads and [deleted] in FY 1986. [Deleted.]

CONGRESSIONAL LIMITATIONS ON PRODUCTION

Mr. **Stratton**. What is DOE doing to comply with the limits Congress has imposed on the production of artillery-fired atomic projectiles?

General **Withers**. Section 1635, Title XVI of the Department of Defense Authorization Act for 1985 requires compliance with the following conditions: (1) the total artillery-fired atomic projectile (AFAP) production may not exceed 925; (2) the total amount to be spent for production of both warheads, after enactment, may not exceed $1.1 billion; (3) no AFAP produced after enactment may be produced in the enhanced radiation version; (4) special emphasis shall be placed upon improvement in the safety, security, range, and survivability of such warheads; and (5) replacement of obsolete AFAPs in Europe shall be carried out in accordance with agreements reached by the NATO Defense Ministers at Montebello, which required withdrawal of 1,400 tactical nuclear warheads from the European stockpile.

The Department of Energy will not exceed the 925 warhead limit. Our estimates of production costs will keep us under the $1.1 billion limit. [Deleted.] The modernized AFAPs have improved safety, security, range, and survivability over the older AFAPs.

The requirement to comply with the Montebello agreement is being handled by the Department of Defense, but my understanding is that AFAP replacement in Europe will be in accordance with that agreement.

BACKUP PRODUCTION CAPABILITY

Mr. **Stratton**. The nature of your operations suggests that a single-point failure may close your operations. What have you done to assure that nuclear deterrence and the security posture of this country are not jeopardized?

General **Withers**. There are some identified situations which could severely impact the ability of the DOE to meet production requirements. In order to minimize the probability that one of these situations will occur—and to limit potential disruption of deliveries should one occur—the DOE is continuing to upgrade security measures at the weapons production plants. We also have in place special arrangements to ensure the availability of certain critical capabilities, processes, and components.

With respect to these arrangements, the highest priority is given to protecting the national security by providing backup for capabilities required to maintain the nuclear weapons stockpile. DOE has implemented a program to provide a partial backup of the Savannah River Plant's tritium container filling capability by providing functionally similar facilities at the Mound Plant. To offset a potential interruption in production at the Pinellas Plant, DOE has implemented a program to stockpile certain neutron generator types at the Savannah River Plant. This effort will, when completed this July, provide a [deleted] supply of these components.

DOE is considering a program to provide a backup plutonium pit fabrication facility. This is currently in the feasibility study phase and is concentrating on how best to plan for such a facility.

Other areas of backup, sprint, and surge have been identified and are being addressed in a manner consistent with the priorities of the Nation and DOE.

EQUIPMENT AND UTILITIES RESTORATION

Mr. **STRATTON**. Considering the deteriorated state of equipment and utilities at your facilities, why have you not requested more funding for your restoration program?

General **WITHERS**. Considering overall budgetary restraints and weapons program priorities, the funding level requested for the Restoration program in FY 1986 is adequate to accomplish planned projects.

FY 1986 MANPOWER LEVEL

Mr. **STRATTON**. Is the 250 FTE increase in the research and development program in FY 1986 sufficient to meet your program goals given the dynamic strides the Soviet Union has made in its nuclear weapons program and the priority this Administration has placed on Defense Programs?

General **WITHERS**. It is difficult to say how much research and development is enough, and what we know of the Soviet program is indeed worrisome. Considering overall budget restraints, the 250 FTE increase is deemed sufficient.

SANDIA NATIONAL LABORATORIES' RADIATION-HARDENED INTEGRATED CIRCUITS [RHIC] FACILITY

Mr. **STRATTON**. The DOE Inspector General has issued a report recommending deferral of the RHIC facility at SNL. Could you explain your position?

General **WITHERS**. OMA views the microelectronics program at SNL essential for assuring the availability of radiation-hardened integrated circuits for future weapon systems. It would be shortsighted to assume that further advances in this area are not required, and we do not believe that private industry desires or is able to commit itself to the timely research and development and production of very limited quantities of unique radiation-hardened integrated circuits necessary to support the weapons complex. We consider that construction of the new RHIC facility at SNL as essential in making further vital advances in integrated circuit research and development possible. I want to assure you, however, that quantity production of non-nuclear components will be performed by private industry and DOE government-owned contractor operated production plants whenever possible.

NUCLEAR-DRIVEN SYSTEMS FOR SDI

Mrs. **LLOYD**. General Hoover, would you comment on the political defensibility of nuclear weapons-driven systems as part of the Strategic Defense Initiative program? What kind of program priority has been assigned to activity such as lasers driven by nuclear weapons?

General **HOOVER**. We feel strongly that research on nuclear-driven systems is an important part of the national Strategic Defense Initiative program. The Secretary of Energy and the Secretary of Defense recently signed a policy statement which specified the reasons for conducting nuclear-related Strategic Defense Initiative research. They are:

(1) To determine the feasibility and effectiveness of counterdefensive nuclear-driven systems that an adversary may develop for use against future United States surveillance and defensive systems,

(2) To understand the technical feasibility and impact that such concepts might have on our deterrent forces if utilized in Soviet defensive systems, and

(3) To explore nuclear directed energy options as Strategic Defense Initiative possibilities if needed.

In the context of this policy statement and in keeping with the high national priority of the President's initiative, we intend to devote all real growth in the weapons research, development, and test program to Strategic Defense Initiative-related activities.

SELECTION OF CONTRACTORS FOR DOE FACILITIES AND NATIONAL LABORATORIES

Mr. STRATTON. What is the impact of the requirements of Public Law 98-369, the Competition in Contracting Act of 1984, on the selection of contractors or extension of contracts for operation of Department of Energy production facilities and national laboratories?

General HOOVER. We do not think that The Competition in Contracting Act of 1984 will have any effect on the selection or extension of contracts for the operation of the Department's production facilities and national laboratories for the following reasons.

In accordance with the Federal Acquisition Regulations (FAR) subpart 17.6, the Department of Energy uses management and operating contracts for the operation, maintenance, or support of Department-owned or -controlled research, development, special production, or testing facilities dedicated to the performance of major agency programs.

The management and operating contractor concept evolved from the Manhattan Engineer District's Atomic Bomb project during the second World War and was refined by the Atomic Energy Commission, a predecessor to DOE. Essentially, the DOE uses its management and operating contractors to manage its major research, development, testing, and production facilities. These include facilities such as our national laboratories and the various plants and facilities used in our nuclear weapons and naval reactors programs. The contracts are designed to dedicate the scientific, technical, and management "know how" of private industry and academia to our major missions in a long-term cooperative relationship. Over the years, these management and operating contractors have had a remarkable record of scientific and technical success.

When a new contractor is sought for the operation of a facility, normal competitive procedures are used which are similar to any other procurement. The usual terms of management and operating contracts are five years. After five years (and ordinarily subsequent five-year periods), the Department uses an extend/compete process to determine whether to continue with the incumbent contractor. This process is recognized in the Federal Acquisition Regulation subpart 17.605 with specific criteria for extension or renewal provided in subsection 17.605(c). If, as a result of this review, any new contractor for a management and operating contract is to be selected, it is the Department's policy to compete the procurement under generally prescribed competitive procedures.

The extend/compete process is supportable under a number of provisions of The Competition in Contracting Act. For example, both the FAR and The Competition in Contracting Act of 1984 recognize industrial mobilization or establishment or maintenance of an essential engineering, research, or development capability as a valid exception to using competitive procedures when renewing such contracts by the addition of new subsection 303(c)(3) to the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 253) which provides:

"(c) An executive agency may use procedures other than competitive procedures only when. . . .

"(3) It is necessary to award the contract to a particular source or sources in order (A) to maintain a facility, producer, manufacturer, or other supplier available for furnishing property or services in case of a national emergency or to achieve industrial mobilization, or (B) to establish or maintain an essential engineering, research, or development capability to be provided by an educational or other nonprofit institution or a federally funded research and development center. . . ."

This, along with other provisions of the Act, recognizes the needs of the Department of Energy to maintain and support its production, testing and research facilities through its management and operating contractors. Effective work performance under management and operating contracts involves high levels of expertise and continuity of operations and personnel. If an existing contractor has a satisfactory record of performance, it generally will be Department policy to extend performance under Section 303(c)(3) of the Federal Property and Administrative Services Act and FAR. This decision is based on a review of contractor performance during the contract using the criteria set forth in the Federal Acquisition Regulation FAR 17.605(c).

Mr. STRATTON. The next witness will be Dr. Batzel, Director of the Lawrence Livermore National Laboratory.

STATEMENT OF ROGER E. BATZEL, DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. BATZEL. Mr. Chairman.

Mr. STRATTON. Doctor, good to see you. Have a chair, won't you.

Dr. BATZEL. All right. I think that would be more comfortable.

Mr. STRATTON. We appreciate your testimony.

Dr. BATZEL. Surely.

Mr. STRATTON. Tell us what your problems and hopes are. I have a feeling, very frankly, that except for our conversations with Dr. Wagner yesterday, that we aren't really getting anything that we can put our teeth into. This seems to be kind of an enormous presentation. Somebody has cut millions out of the bill.

The study that was supposed to have been provided by the Department has not been instituted, and we are going in all directions. And I think we have got a number of new members on this committee. I think we ought to try to get them familiar with specifically what is happening in this program. So we would be very happy to have you give us the view from your perspective.

Dr. BATZEL. I will certainly try to do that.

I wanted to acknowledge Mr. Price and his many contributions to the programs over the years. He has been a good friend. We still look forward to working with him in the future.

Now, with respect to the Livermore Laboratory, for the benefit of the new members, we are about an 8,000-man laboratory located in Livermore, CA, which is 45 miles east-southeast of San Francisco, and we share contiguous sites with the Sandia National Laboratory Livermore Branch of about 1,000 people.

Our major commitment to the country has been and continues to be nuclear weapons research and development. That is what we are there for. We have other programs, energy related, but again, our major commitment is nuclear weapons research and development.

Within that framework, our first responsibility is meeting Department of Defense commitments for warheads for military systems.

Dr. BATZEL. Today, those are the———

Mr. STRATTON. Doctor, excuse me for interrupting, but we have a malfunction in the clock. I don't know whether we have the scientific expertise in this room to fix it, and we don't have any bells that tell us that we are supposed to vote on the approval of the journal, a request that began at 11:02. We have to vote by 11:17, so I think perhaps we ought to take a brief recess while we go over and decide on that weighty question.

[Brief recess.]

Mr. STRATTON. The subcommittee will come to order, and, Dr. Batzel, we will be happy to have your testimony at this point.

Dr. BATZEL. Thank you.

WARHEADS FOR THE MX AND SMALL ICBM

I was just beginning the discussion of our nuclear weapons commitment for the Department of Defense. These are the five systems in which we are involved today. You can see the status as listed [chart deleted]. I want to spend a few minutes on one particular warhead and system, and that is the warhead for MX.

We must assume that the MX will be deployed. We have done the necessary work to provide a warhead for that system. It includes insensitive HE [deleted].

We have included safety features in this particular warhead which make it possible to use it in a mobile system. Right now it is the base line warhead for the small ICBM. We have taken and continue to take this particular area as our first priority and our first responsibility. That comes first. I want to make that very clear.

Mr. STRATTON. When you say that this is the same warhead for the Midgetman, this is one reentry body, right?

Dr. BATZEL. This is one reentry body, yes.

Mr. STRATTON. And in the MX, there will be 10 reentry bodies and in the Midgetman, just 1, is that correct?

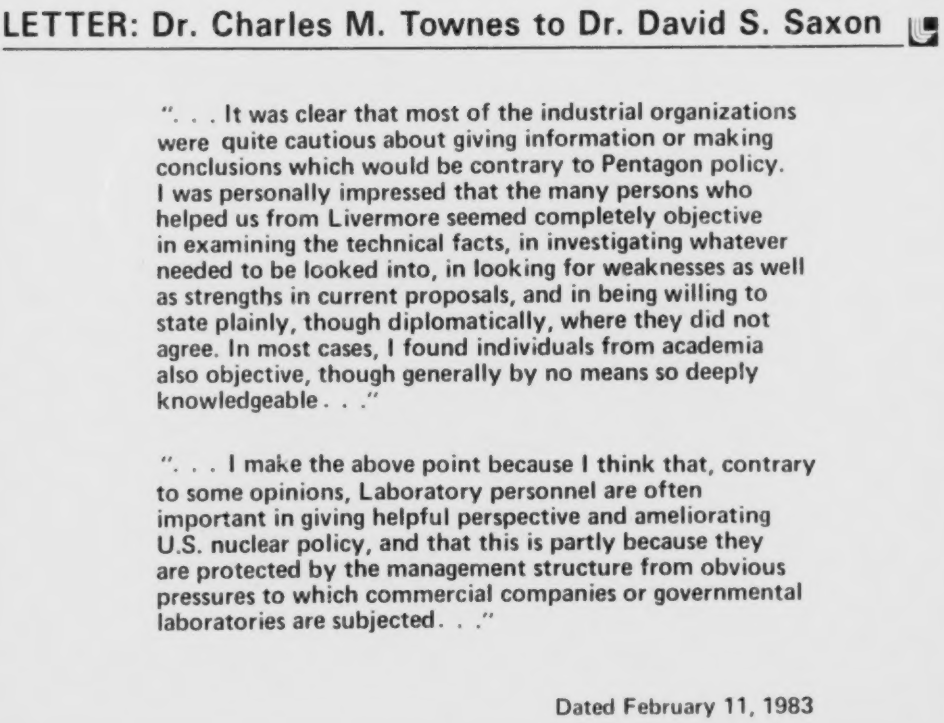
Dr. BATZEL. There will certainly be one on the small ICBM, yes.

Mr. STRATTON. What about accuracy? You don't have anything to do with the question of accuracy?

Dr. BATZEL. The issue of accuracy belongs to the Air Force. The question of whether the MX should be built or not centers around a lot of discussion, which I won't undertake this morning.

BLUE RIBBON TASK GROUP STUDY

Another area I want to cover briefly is the Blue Ribbon Task Group, which is to review the relationship between the Department of Energy and the Department of Defense as it relates to the nuclear weapons program overall. I want to discuss rather specifically the role of the national laboratories as it relates to that particular study.



LETTER: Dr. Charles M. Townes to Dr. David S. Saxon

". . . It was clear that most of the industrial organizations were quite cautious about giving information or making conclusions which would be contrary to Pentagon policy. I was personally impressed that the many persons who helped us from Livermore seemed completely objective in examining the technical facts, in investigating whatever needed to be looked into, in looking for weaknesses as well as strengths in current proposals, and in being willing to state plainly, though diplomatically, where they did not agree. In most cases, I found individuals from academia also objective, though generally by no means so deeply knowledgeable . . ."

". . . I make the above point because I think that, contrary to some opinions, Laboratory personnel are often important in giving helpful perspective and ameliorating U.S. nuclear policy, and that this is partly because they are protected by the management structure from obvious pressures to which commercial companies or governmental laboratories are subjected . . ."

Dated February 11, 1983

Now I will do that in the context of a letter which Dr. Charles Townes wrote after his committee studies the question of MX basing.

Mr. Stratton. This doesn't have anything to do with the ICF.

Dr. Batzel. No. I am going to come to that subsequently.

The issue which Dr. Townes raised was the one of independence of the laboratories to help in resolving issues of national importance. This is an excerpt from that letter. It points out that the laboratory, in this case Livermore, but it could be applied equally as well to Los Alamos or Sandia, was able to provide objective evaluation of technical information which allowed him to make what he felt was a reasonable recommendation on MX basing options based on solid technical information. That is an example of why I believe it is important that those laboratories retain their independence and in that frame work can provide a source of objective technical information.

Mr. Stratton. Very good.

NUCLEAR DIRECTED ENERGY WEAPON CONCEPTS

Dr. Batzel. Now I want to talk about directed energy weapons; that is, nuclear weapons which have been configured to direct some fraction of their energy into some smaller cone, or ray, of energy. This is the technology which we began addressing approximately 6 or 7 years ago.

In fact, we started developing the technical base for this technology some 10 years ago. And so far, it has led to the following concepts.

First is the nuclear-driven x-ray laser.

[Deleted.]

What the potential of these systems will turn out to be in terms of offense or defense is not clear at this juncture—these areas are new. They are idea rich. And we have no reason to believe that we have more than scratched the surface with respect to the potential of these technologies.

Mr. STRATTON. I am trying to recall, when was it that we were last at Livermore, about a year, a year and a half?

Dr. BATZEL. Yes.

Mr. STRATTON. I don't recall that there was any reference made to this directed energy concept at that time.

Dr. BATZEL. It must have been longer than a year-and-a-half. [Deleted.]

Mr. STRATTON. No, I don't mean in this. It was another——

Mr. KLEIN. I think it was a briefing on the three-dimensional mockup of a laser——

Mr. STRATTON. No, no.

Dr. BATZEL. Just this last fall, working along with Rochester and KMS, and using the Novette facility, we demonstrated an x-ray laser in the laboratory. That result is just a few months old.

Mr. STRATTON. You have had so many developments, I guess it is hard to recall it now. But something. We had a discussion on this in the committee.

Dr. BATZEL. Maybe I will come to it somewhere along the way in my discussion.

Mr. STRATTON. What I am talking about was special isotope separation.

Dr. BATZEL. I am going to come to that one rather specifically. I will have a few comments on that one, if that is all right. I would be glad to comment now.

Mr. STRATTON. You have got so many things going there, it is hard for us to keep up with them.

Dr. BATZEL. Thank you.

Mr. STRATTON. Go ahead. Sorry to interrupt.

Dr. BATZEL. This is a conceptual design of a directed energy weapon, the so-called x-ray laser. [Deleted.]

It is interesting that the Fletcher [deleted].

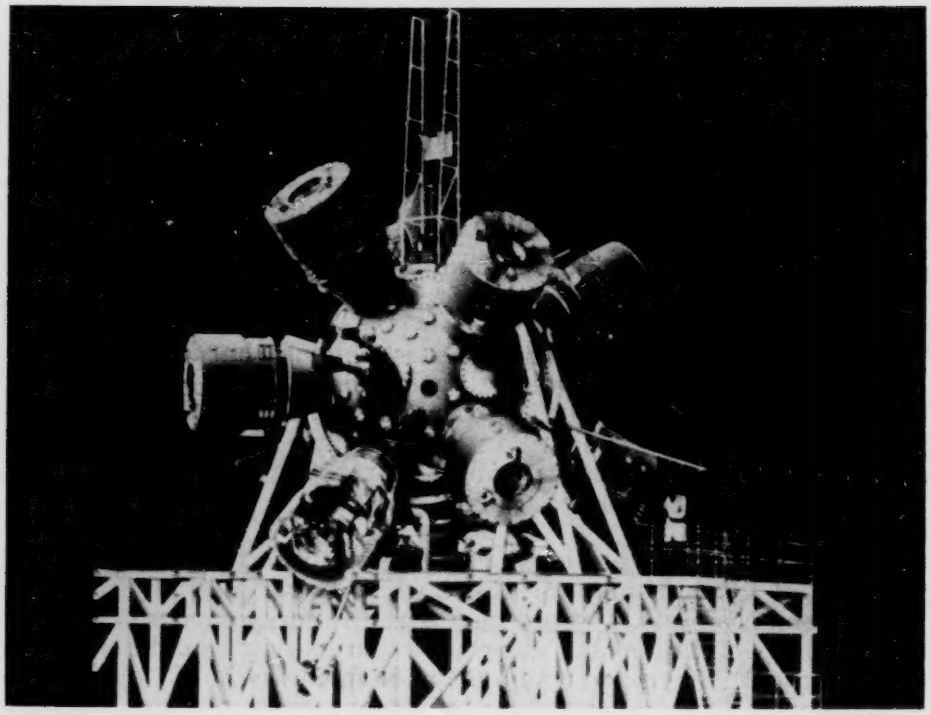
That is our goal. Whether SDI goes or not, whether this concept is excluded, because it is nuclear—I think that is beside the point.

Mr. STRATTON. [Deleted.]

[Deleted.]

INERTIAL CONFINEMENT FUSION

I do want to switch to ICF rather specifically. We have completed NOVA.



This is a layout of the target chamber. It is a large structure. The facility is now complete. We are hoping to have a dedication some time in the next month or two, and certainly extend an invitation to all of you to attend. We expect to find a way to operate this facility.

I think it would be irresponsible for us to construct a $175 million facility which we believe is important to the Nuclear Weapons Program and not operate it. We have got to figure out a way to provide the funds which will allow us to operate this facility and derive the necessary information.

Mrs. Holt. May I ask how much you think it would take to do that?

Dr. Batzel. To operate the NOVA facility in a vigorous kind of way would cost about $50 million a year.

Mrs. Holt. $50 million?

Dr. Batzel. $50 million. That is correct. [Deleted] we would need another $15 million, which is about the level at which we are this year.

Now, the consequence of the budget breakdown, at least the way we have it today, is that we will lose approximately 250 technical people from that program and out of the laboratory.

If you will look at the total of RD&T, there is an overall decrease in manpower at a time which I think is very unfortunate for the laboratory. We have just asked people to work very hard in developing a facility. It is something of which they are very proud. Now they find the basis on which they were operating has changed.

Mrs. Holt. Mr. Chairman, may I?

Mr. **Stratton**. Mrs. Holt.

Mrs. **Holt**. How much would it take to have a healthy ICF program? How much would we have to put in there to be sure we were moving as fast as we can move?

Dr. **Batzel**. Yes. Well, to run NOVA vigorously is $50 million a year. [Deleted] another $15 million.

There is another caveat that I want to put in, and that is we are also very tight in research and development and testing. Taking dollars out of weapons research and development and putting them in ICF doesn't help me. I have got to find a way of increasing that overall package, somehow.

Mr. **Stratton**. There is no question about the fact that this NOVA operation is tied in directly with the Nuclear Weapons Program. It is not just a scientific experiment which is interesting and dramatic and so on. What we are really doing with ICF is that we are dealing with a direct weapons undertaking, isn't that correct?

Dr. **Batzel**. That is correct. [Deleted.]

[Deleted.]

Mr. **Stratton**. My recollection is that when we first got into this, the idea of laser fusion was the hope that we might be able to produce something that would have strong energy capacity, but not the problems of fission. But everybody told us that would not develop until the 21st century, which isn't too far away now.

But we are focusing on it not as a new means of energy, but as an asset in nuclear weapons. Is that correct?

Dr. **Batzel**. Yes, that is correct. I still believe laser fusion has potential as a fusion energy source. In the longer term, I think that prospect is still there. It shouldn't be ignored in any sense.

Mr. **Stratton**. I think we will have to recess again for a crucial vote that would give us another 3 days' recess on top of the 3 or 4 months that we have had since the last election.

[Recess.]

Mr. **Stratton**. The subcommittee will come to order.

Dr. Batzel, I think Mrs. Byron has some questions she wants to ask.

Mrs. **Byron**. Let me, first of all, say that I said earlier, when I was talking to General Withers, I was concerned about where we are going in some of our programs. I am looking at it a little more in depth as to where we are going with recruiting young scientists, because, as I mentioned earlier, we have got problems within our graduate schools for slots, where we are finding many of our foreign entrants taking up those slots which would then preclude them from coming into any of our labs.

I think we are beginning to see a positive aspect in recruiting. But taking that further, it really concerns me greatly when we get exciting innovative programs, and I know a lot of people aren't in there for the money or glory of it. They are in there for the challenge. Then when we get programs that are challenging, we get them developed, we get them moving through.

And I do better in specifics. I go back to the NOVA program, which has been one that has been funded at a fairly extensive level, $176 million originally. Then we get ready to close down those programs or cut them back considerably. Mrs. Holt asked you what you felt was the basic amount necessary to keep that program. I know you have to look at the overall funding level.

At the same time, don't we have a number of public vendors that are operating that, on a basis of utilization, isn't there a large number of individuals that are——

Dr. BATZEL. Prepared to support NOVA?

Mrs. BYRON. Yes.

Dr. BATZEL. The answer is no, at this stage of the game.

Mrs. BYRON. Is there a potential there?

Dr. BATZEL. I think there is a potential there.

Mrs. BYRON. Would that be an area where we on a contract basis could develop a continuation for keeping it operational?

Dr. BATZEL. I think that is one of the areas we surely would look at. I think what we need to do is look ahead as to how, in fact, we as a country can make the best use of that particular facility. I think that the laboratory scale x-ray lasers have a significant potential for utilization in the future. That is something we have to explore further. We need to work that problem. That is fair.

Mrs. BYRON. You talked a little bit about the underground testing and you talked to several areas of underground testing. With the cuts that you are going to be experiencing, what do you think that will do to underground testing? How much will it affect your programs?

Dr. BATZEL. We want to reexamine our underground test program for fiscal year 1986 in the light of the dollars we have available as a package. I think there is some possibility that we may well want to trade off a nuclear test to provide resources for other programs. We haven't faced that as yet.

I think that is a real possibility. I would view having to trade off a nuclear test as a very negative step. But it may, in fact, be essential.

Mrs. BYRON. How many underground tests are you currently conducting on a yearly average?

Dr. BATZEL. [Deleted.]

Mrs. BYRON. Without jeopardizing programs, how many underground tests can we cut back on?

Dr. BATZEL. As I say, we have looked at the underground test program. If we end up as squeezed as we are today with respect to dollars, and I have to figure out a way to operate NOVA within that, I am going to look very hard at the question of trading off one of those nuclear tests.

At this stage of the game, I view those [deleted] as very solid requirements. It is going to be with extreme pain that I would recommend we take such a step as to tradeoff one of those experiments.

Mrs. BYRON. Is the saving from one test large enough to make a difference?

Dr. BATZEL. It will help. And it depends on the test. The test saving is one I am going to have to sort out with the Nevada Operations Office, [deleted]

Mrs. BYRON. There is a bill currently being proposed in Congress which would eliminate all underground testing. If that, heaven forbid, should pass, that would eliminate a lot of your funding problems, would it not?

Dr. BATZEL. It would also eliminate the laboratories' capability in nuclear weapons technology in the longer term.

Mrs. BYRON. In other words, if that bill would pass, many, or the majority of the programs under consideration or under operation in the laboratory would be eliminated, is that correct?

Dr. BATZEL. In the longer term, that would be the consequence.

Mrs. BYRON. Mr. Chairman, thank you.

Mr. STRATTON. Let me just ask the gentlelady, is this a bill that wants the tests above ground rather than underground? [Laughter.]

Mrs. BYRON. I think we should ask the sponsors.

Mr. STRATTON. Who is it, Mrs. Boxer?

Mrs. BYRON. Mrs. Boxer and Mr. Mavroules.

Mr. STRATTON. It is my understanding that this should not be a unilateral arrangement. The proposal is a comprehensive test ban treaty.

I am wondering if their suggestion is that we should initiate it and let the Soviets go ahead and do whatever they want to? Is that your understanding?

Mrs. BYRON. You will have to ask the sponsors. I am not one of the sponsors.

Mr. STRATTON. Unfortunately the sponsor isn't here, so we will have to ask him later.

Are there any other questions for Dr. Batzel?

SPECIAL ISOTOPE SEPARATION

Dr. BATZEL. I had one further subject. That was the special isotope separation. That is the issue you raised.

Mr. STRATTON. Yes.

Dr. BATZEL. We are very pleased with the technical development in that particular area. We are at a phase now where we believe we can go into what is called engineering development. We are in a position also to say that a commitment to a production level facility is a viable alternative. It can be done at this juncture, based on where we are technologically.

Another point I wanted to make relates to the civilian reactor fuel. The plutonium from civilian reactors is not useful to the nuclear weapons community because of the high plutonium 240, 241 content. If the United States really wants to have the flexibility to use that material, it needs a production scale special isotope separation capability.

With that, that completes my comments.

Mr. STRATTON. That was my understanding, that by developing that capability, it would in fact give us more of the plutonium that we have in either short supply, or have enough to survive on a hand-to-mouth basis.

What kind of a program would be required to transform that into significant amounts of weapons grade plutonium?

Dr. BATZEL. At the current time, we have approximately [deleted] of plutonium available that belongs to the weapons community which can be cleaned up and made available to the system, and that is the target we are looking at today.

What is required to do that cleanup is a production scale facility, and the site we have been discussing is the Richland or Hanford site. We can see our way through that program. There will be an engineering development of what is now a technological capability at Livermore, and then transfer of that technology to Hanford, Richland.

Mr. STRATTON. Do you have any idea of what that would cost?

Mr. HOOVER. $600 million total.

Dr. BATZEL. The number I remember is $600 million total. From the point of view of cost per gram of plutonium, that is still an inexpensive way to get that material.

Mr. STRATTON. Good. Thank you.

Do you have a question, Dr. Mansfield?

Dr. MANSFIELD. The construction request for construction money at Livermore, No. 1, can you tell me how much it is?

No. 2, can you tell me if that represents your highest priority projects?

Dr. BATZEL. I am sorry, I don't remember that list, Jack. I will just have to go back and look at it again.

Dr. MANSFIELD. Did your highest projects make it, can you tell?

Dr. BATZEL. It is my recollection that, in fact, our highest priority items survived.

Set forth below is a listing of Defense Programs-Weapons Activities new start construction projects that did not make it into the FY 1986 President's budget.

Project description	TEC	Fiscal year 1986 B/A requirement
Research and development:		
Nuclear Weapons Research, Development, and Testing Facilities Revitalization, Phase II, Various Locations (11 subprojects)	($312.8)	($28.8)
Weapons Technology Center, Lawrence Livermore National Laboratory	19.8	1.8
Laboratory Data Communications Center, Los Alamos National Laboratory	25.0	3.0
Dual-Axis Radiographic Hydrotest Facility, Los Alamos National Laboratory	27.2	3.0
Special Nuclear Materials R&D Laboratory Replacement, Los Alamos National Laboratory	210.0	8.0
High Intensity Source Laboratory, North Las Vegas	1.9	1.9
Relocate Area 3 Construction Camp, Nevada Test Site	19.7	1.9
Drilling Operations Building-Area 1, Nevada Test Site	1.4	1.4
Relocate Drilling Subdock-Area 1, Nevada Test Site	1.7	1.7
Water Distribution System-Area 1, Nevada Test Site	0.7	0.7
Sewage System-Area 1, Nevada Test Site	0.5	0.5
Dormitories-Mercury and Area 12, Nevada Test Site	4.9	4.9
Production and surveillance:		
Plutonium Area Laundry, Rocky Flats Plant	5.5	0.6
High Explosive Machining Facility, Pantex Plant	150.0	8.0
Retrievable Plutonium Storage Vault, Rocky Flats Plant	16.5	1.4
Weapons Production Primary Standards Laboratory, Sandia National Laboratories, Albuquerque	18.0	1.0
Fire Protection Upgrade, Y-12 Plant	9.5	1.0

Mr. STRATTON. Mrs. Lloyd.

Mrs. LLOYD. Doctor, I appreciate your testimony. I am looking forward to getting out to your facilities this next year. I do want to commend you on your long-range planning exercise.

Do you feel the challenge is focused enough on the present rather than maybe being too ambitious looking for tomorrow's efforts, programs, in this climate?

Dr. BATZEL. Our first priority item is always provision of warheads for the Department of Defense. That comes first on our priority list.

Mrs. LLOYD. Yes.

Dr. BATZEL. We then have protected the design capability, which is essential to providing future capabilities, for the Department of Defense. We worry about the same issues as you do. Are we putting too much of our efforts into the longer term technologies?

I think the balance is about right. We have worried that one through. It is a very good question, and it is a difficult judgment to make. I think our balance is reasonable. I would be worried if we had to take away from what is our technology base for nuclear weapons, which meet Department of Defense requirements, and further distort our efforts in terms of putting more effort into the longer term, say, directed energy weapons, for example.

Mrs. LLOYD. Another thing, I was interested in your comments on SIS. It is my understanding that our Y-12 plant supplied you with weapons grade material. Am I wrong?

Dr. BATZEL. The Y-12 plant——

Mrs. LLOYD. At Oak Ridge.

Dr. BATZEL. The Y-12 plant provides us with weapons grade U-235 for our weapons program. That is an essential element and, as General Hoover pointed out, there has been a stockpile of enriched uranium available to the weapons program, which has not been supplemented recently. There will be an effort to increase our available uranium 235 supply, and that certainly Oak Ridge will be involved.

Mrs. LLOYD. Thank you. Thank you, Mr. Chairman.

BUFFER LAND ACQUISITION

Mr. STRATTON. Dr. Batzel, what has happened with regard to the additional space that we approved to protect the laboratory from terrorists or demonstrators? Has that been carried out since our last budget was approved?

Dr. BATZEL. We have acquired or are acquiring a significant fraction, in fact the major fraction, of the land around the laboratory which this committee in fact authorized, and then funds were appropriated. We have acquired most of the land along the west side of the laboratory. We expect to take title to the section of land across the northern strip of our property. Included in the fiscal year 1986 budget is $10 million which should allow us to buy the land to the south, which includes a boundary for the Sandia Laboratories and the remainder of the land on the west side.

So we are very pleased with the way that has gone. The Corps of Engineers has done an excellent job in supporting us in that particular area.

Mr. STRATTON. That will be fenced off, or what?

Dr. BATZEL. That will be fenced off. It will give us another at least 500 feet between the internal boundary of the laboratory and the outside world, which we feel is very important from a safeguards and security point of view.

Mr. STRATTON. Any other devices? Are you going to mine the territory?

Dr. BATZEL. We don't intend to put a moat around it. We are looking at the question of how we should use that particular land in terms of security. The land has to be cleared and it has to be lighted. And then, the question of what more we do is something we are going to sort out with time. But at least, we won't have people in the position of just coming over the fence and there they are in the laboratory.

Mr. **Stratton**. Have you had any other significant demonstrations lately?

Dr. **Batzel**. Our most recent significant demonstration was last June. We had a few hundred people, which is down from a few thousand the year before. There has fortunately been a general trend downward in terms of interest applied to the laboratory in that particular form.

Mr. **Stratton**. Thank you very much.

Mr. Klein, any questions?

In view of the problem with the clock, we will adjourn at this time, and will meet at 2 p.m. in 2212, the room we were in yesterday. The subcommittee will stand recessed until 2 p.m.

[Whereupon, at 12:32 p.m., the subcommittee was recessed to reconvene at 2 p.m. the same day.]

[The following questions were submitted to the witness to be answered for the record:]

Mrs. **Lloyd**. Dr. Batzel, I've been very interested in the excellent long-range planning exercise which has taken place at Livermore. Can you summarize the Lawrence Livermore National Laboratory (LLNL) Plan and further, would you comment on the challenge to the Laboratory in being focused enough rather than a bit too ambitious in setting its sights on tomorrow's programs?

Dr. **Batzel**. The first mission of the Livermore Laboratory is to serve as a national resource of scientific and technical capability for the nation's defense programs. Our primary role is to perform research, development, and testing associated with the nuclear design aspects of all phases of the nuclear weapons life cycle and with the understanding of nuclear explosions.

We have also over the years developed important missions in the areas of energy, environment, and basic science. The major areas addressed are: fusion, isotope separation, biomedical and environmental research, non-nuclear directed energy technology, and applied energy technology.

With these responsibilities in mind and, given the changing circumstances affecting our programs, I established a long-range planning committee in 1981 to help me and the Laboratory program directors assure that the Laboratory continues to focus its talents on major national problems.

The committee reviewed scores of scientific and technical issues and was advised by many eminent outside experts and scholars. Two years ago, the committee made its first recommendations and we have been implementing those recommendations as appropriate. Many of the recommendations had to do with the direction and focus of our defense work. Other recommendations had to do with new technologies that build upon programs or skills already well-established at Livermore. Our resources are limited and we always want to be sure that we are applying them in the most effective way for the nation.

The details of the planning process we went through and the many recommendations of the committees are too numerous to go into here. However, we feel that such a planning effort is a necessary periodic activity at any national laboratory. We would be pleased if you or your staff would be able to visit Livermore to review our long-range planning activities in more detail.

Mrs. **Lloyd**. Dr. Batzel, would you summarize the Lawrence Livermore National Laboratory role in SDI and indicate where your program priorities are?

Dr. **Batzel**. The Laboratory has two major efforts that could have an application to strategic defense: nuclear directed energy weapons research and development for the DOE, and beam weapons research for Strategic Defense Initiative Office.

Five or six years ago the Laboratory conceived of [deleted] "third generation" weapon concepts—directed energy devices powered by nuclear explosives. (Fission weapons are considered first generation weapons; thermonuclear weapons, second generation.) [Deleted.]

In the summer of 1983, a study panel chaired by Dr. James C. Fletcher studied the possibilities for strategic defense. Even then the capabilities of the x-ray laser were potentially important enough to lead to two major conclusions:

[Deleted] placed in the top priority—[deleted]. I'd like to quote the statement the panel made:

"It is important to determine the ultimate limits of nuclear-driven x-ray laser performance because of their potential as a major threat to our space-based assets, in addition to their potential role as a missile defense weapon." (DTST Report, Vol. II) [deleted].

An important issue in developing strategic defense architectures will be treatment of nuclear weapons and nuclear disturbed environments. Even a low leakage defense against massive ballistic missile attacks must survive direct attacks as well as the collateral effects from nuclear bursts. The United States cannot afford to assume that the Soviets would relinquish nuclear weapons to negate United States defenses or in the construction of a defense of its own. [Deleted.]

Nuclear weapons are the source of much concern and much controversy. On the one hand, they provide opportunities for deterrence, for defense and—in the hands of others—for coercion that cannot be matched by any other source of energy. On the other hand, we are all loathe to extend the nuclear competition into new areas or to make it more dangerous. We at the Laboratory have no quick answers to this continuing dilemma. We believe, as I know this Committee believes, that present and future policy must be formed by the best understanding of what is and what is not possible that we can get. With this goal in mind, I suggest continuing nuclear research and development as an essential part of strategic defense research as nuclear weapons research has been and continues to be an essential part of our deterrence posture.

The Laboratory conducts research on beam weapons as part of the directed energy beam weapons research program funded by the Defense Advanced Research Projects Agency/Strategic Defense Initiative Office. [Deleted.]

Mrs. **Lloyd**. Dr. Batzel, where is the largest program growth at your Laboratory? Is it in areas where you have a strong capability?

Dr. **Batzel**. The DOE FY 1986 budget request for the Livermore weapons research, development, and testing is slightly less than FY 1985 in terms of real purchasing power. However, over the past several years we have had real increases in this program. The Special Isotope Separation Program has also shown real growth. These programs are at the heart of our mission and utilize our strongest skills and capabilities.

Mrs. **Lloyd**. Dr. Batzel, could you tell us something about the Conflict Simulation Center at Livermore? What are the planned expansions for the Center? How is the Center linked to other war gaming systems such as at the Naval War College in Newport, Rhode Island? I've seen some criticism that other planned systems are largely duplicative, such as the $67 million system planned for the Air War College. Are you and General Hoover assured that the CSC at Livermore is a truly complementary facility and will be linked up to DOD facilities in a way that it can be utilized in an optimum fashion for national security purposes?

Dr. **Batzel**. The Conflict Simulation Center is an operational facility at Livermore which models conflict situations involving nuclear weapons effects. The thrust of the effort is to continue development of the simulation and analytical capabilities to examine questions focused on tactical nuclear issues for joint air and land forces. The simulation is currently able to evaluate technical issues at the army brigade and division level. Current development is focused on the ability to increase the scope of the effort to an Army Corps simulation examining both air and land battle.

The heart of the Conflict Simulation Center is a modest computer facility including two VAX 11/780 computers and various graphics workstations, disk drives, and peripherals. This total hardware costs about $1,180,000.

There are no planned major hardware expansions which would increase the size or scope of the operational facility.

The CSC is staffed with analysts and computer scientists who are aware of war gaming efforts currently ongoing throughout the DOD community. Most conflict simulations and war games do not model or game the full impact of nuclear weapons effects. The effort at Lawrence Livermore National Laboratory is to create a tool which fully addresses both detailed nuclear weapons effects and command and control issues on the battlefield. DOD organizations have sent their people to Livermore to use the facility to study nuclear and nonnuclear issues. Lawrence Livermore National Laboratory has exported and is supporting the simulation to the Army War College and TRADOC. Discussions are underway to increase that support army-wide.

Under current agreements with the Army and Air Force, there are three Army officers and two Air Force officers actively participating in the development effort.

Mr. **Stratton**. Dr. Batzel, the justification that accompanies the President's budget says that the weapons laboratories are going to grow by 230 full-time equivalents in FY 1986. What is the situation at your laboratory?

Dr. **Batzel**. As you know, the FY 1986 DOE request for weapons research and development operating funds (when adjusted for Inertial Confinement Fusion) reflects a 3.5 percent increase in budget authority over FY 1985. This is less than what we expect inflation to be in that time frame. As a result, we anticipate having to reduce our weapons research, development, and testing program by about 65 direct full-time equivalents. The Inertial Confinement Fusion budget of $70 million ($23.2 million for Lawrence Livermore National Laboratory) would result in a reduction of about 180 full-time equivalents. Together this would total to a reduction of about 245 direct full-time equivalents from the combined weapons research, development, and testing and Inertial Confinement Fusion programs. In addition, we would expect to have to cut another 200 full-time equivalents from support and indirect areas.

Mr. **Stratton**. What level of funding would be necessary to accelerate the x-ray laser program?

Dr. **Batzel**. To reach by the early 1990's the million times enhancement milestone for the x-ray laser described in my testimony would require about [deleted] for about five years. About [deleted] of that total would be for research at Livermore; [deleted]. Currently, at Livermore we are spending about [deleted] or a shortfall of about [deleted] from the recommended program.

Mr. **Stratton**. Dr. Batzel, the implication from Secretary Hoover's and General Withers' testimony is that only $70 million is required for the entire ICF program because it will concentrate on weapons physics, dropping any energy work. What portion of your $68.2 million FY 1985 ICF budget is devoted exclusively to energy research and development?

Dr. **Batzel**. In FY 1985, we will spend $1.2 million on research and development exclusively related to the energy applications of Inertial Confinement Fusion. The remainder of $67 million is research and development which is necessary to understand the physics and technology independent of the final end use.

Mr. **Stratton**. What funding in ICF is required to effectively utilize NOVA, and what level is required to have a balanced ICF program at LLNL?

Dr. **Batzel**. NOVA has just been completed at a cost of $176 million for construction and $25 million for diagnostics, totalling about $200 million. To operate and maintain the facility, including target design, target fabrication, diagnostics and data reduction, will cost $50 million per year.

A balanced ICF program at LLNL should be funded at about $70 million in total per year, which includes NOVA operation, [deleted] and a limited amount of laser technology development. NOVA-type [deleted] experiments [deleted] maximize progress for the nation in applying ICF technology to nuclear weapons physics and also someday to commercial fusion power. In FY 1985, our ICF program was funded at $68.2 million in budget authority, and we are looking at roughly an 8 percent inflationary cost increase going into FY 1986.

Mr. **Stratton**. Is the Inertial Confinement Fusion program of major importance to your laboratory and to your Nuclear Weapons Program?

Dr. **Batzel**. Inertial Confinement Fusion research is of major importance to the Laboratory and to the National Nuclear Weapons Program. The major contribution of Inertial Confinement Fusion to date has been in computational physics models developed for Inertial Confinement Fusion, but also of great utility in nuclear design. With NOVA operational, we will have a major experimental tool to explore nuclear weapons physics questions of materials opacity, metal-fuel mix, and instabilities. Such laboratory experiments can complement underground test data and, in some cases, may provide data that has heretofore been unavailable.

The Inertial Confinement Fusion program is of major importance to our Laboratory for several reasons. First, it is the only other large program at the Laboratory which is directly supportive of and broadens the Weapons Program. This is because it addresses similar high energy density physics, helps extend our weapons design codes, substantially augments the development of diagnostic techniques and instrumentation, [deleted]. Second, half of the Inertial Confinement Fusion program resources for laboratory experiments are currently devoted to weapons physics experiments relevant to our conventional and third generation nuclear weapons development programs. Third, the Inertial Confinement Fusion program has been a major pipeline for bringing new bright young scientists into the Laboratory. The Inertial Confinement Fusion program has received much publicity, and that has materially aided the recruiting of new talent. Thus, I believe that it is very important to preserve the Inertial Confinement Fusion program as a separate program rather than to fold it into weapons research and development. As a separate program, its overall contribution to the missions of the Laboratory will be maximized.

Mr. **Stratton**. What is your view of the technical success of your Inertial Confinement Fusion program and of its present utility?

Dr. **Batzel**. The Inertial Confinement Fusion program at Lawrence Livermore National Laboratory has been technically successful [deleted]. The utilization of the Inertial Confinement ~~Fusion technology~~ for weapons physics studies has been made possible by the control and virtual elimination of electron preheat achieved during the last three years by the use of very short wavelength light (0.26–0.53 microns) for target irradiation. Prior Inertial Confinement Fusion studies worldwide at wavelengths of 1.0 microns to 10.6 microns were plagued by electron preheat which made most weapons physics experiments very difficult to interpret.

However, the wavelength conversion of the Novette laser at Lawrence Livermore National Laboratory to 0.26 microns and 0.53 microns demonstrated a virtual elimination of electron preheat, opening the way for wide variety of weapons physics studies. Thus, demonstration of 65 megabar shock waves in metals was rapidly achieved, making possible equation-of-state studies or materials used in nuclear weapons in the laboratory. Also achieved was the first demonstration of stimulated emission (laser action) in the soft ~~x-ray region~~ of the spectrum. [Deleted.] As I have previously commented, the Inertial Confinement Fusion program is of great utility to the weapons program in many ways. I also believe that in the long term Inertial Confinement Fusion may well make a substantial contribution to achieving the production of fusion energy. The goal of energy production by fusion is an important one, and thus at least two different technical approaches (Inertial Confinement Fusion and MFE) are warranted until the goal is reached.

Mr. **Stratton**. What is the status of the NOVA facility—is construction complete? Is it on time and in budget?

Dr. **Batzel**. Last December, we completed the NOVA laser system on schedule, within budget and to full performance specification. This includes high quality and high power beams in three different colors, up to 120 kilojoules in the infrared. These accomplishments would not have been possible without the steadfast support of this Committee.

Mr. **Stratton**. To effectively use the NOVA facility, what level of funding is required in the Lawrence Livermore National Laboratory Inertial Confinement Fusion program?

Dr. **Batzel**. Now that NOVA is operational, we are beginning preparation for fusion experiments at higher energies than ever attempted before. The cost to operate NOVA, provide supporting laser technology development, design and produce fusion targets needed for a vigorous program of weapons physics and fusion experiments, and develop and field fusion diagnostics will run about $50 million per year. Having completed the construction on the largest and most powerful laser ever built, I believe the country should afford the funds to operate the laser. The scientific results will be the most impressive ever seen with new data of importance in physics regimes that are relevant to our ongoing nuclear weapons program and potentially to civilian power in the future. [Deleted.]

Mr. **Stratton**. What total funding is required at Lawrence Livermore National Laboratory to have a healthy Inertial Confinement Fusion program?

Dr. **Batzel**. Including the $50 million in funding required for NOVA, a balanced Inertial Confinement Fusion program at Livermore should be funded at about $70 million. [Deleted.] In FY 1985, our Inertial Confinement Fusion effort is funded at $68.2 million in budget authority and we probably will see roughly 8 percent inflation going into FY 1986.

Mr. **Stratton**. Do you think that the FY 1985 relative levels of funding between Weapons research, development, and testing and Inertial Confinement Fusion at Lawrence Livermore National Laboratory were approximately correct?

Dr. **Batzel**. Yes. The funding for the Lawrence Livermore National Laboratory weapons and Inertial Confinement Fusion programs supported balanced efforts which are making scientific and technical contributions.

Mr. **Stratton**. If the current Inertial Confinement Fusion funding requests of $23 million and the weapons R&D funding of $220.7 million are not augmented, how many people will you have to let go from the Laboratory? Can this be done without a RIF? Is such a reduction consistent with your view of national and defense priorities?

Dr. **Batzel**. About 450 people would have to be let go from the Laboratory if Inertial Confinement Fusion funding and weapons R&D funding are not augmented.

About 250 of that total would be direct staff. If accompanied with cuts in other programs, particularly magnetic fusion, the total would exceed annual attrition through normal staff turnover. The contributions which these programs make to the national and defense priorities is well documented and warrant continued support.

Mr. Stratton. Secretary Hoover, DOE has changed the status of ICF from a separate program office under a civilian Assistant Secretary for Defense Programs to just another program under the Office of Military Application. Since that change, the previously strong DOE support for ICF has completely deteriorated, leaving OMB in charge of the program direction. In addition, this excellent program has ceased to exist as a line in the budget, and the remaining funds have been distributed with a WPA mentality. This comes at a time when the program is making rapid progress and is technically very successful.

Mr. Secretary, would you please address the management problems in Defense Programs and rectify this situation?

General Hoover. Mr. Chairman, the Office of Inertial Fusion and the Office of Military Application are separately and discretely managed, although both do report to the Deputy Assistant Secretary for Military Application. Combining the inertial fusion effort within the weapons research and development budget gives us greater flexibility for the prioritization of those activities which have the greatest benefit to the weapons program. We believe that the success of the inertial fusion program to date and the implications of a successful program over the long term justify the maximum support possible within the constraints of the budget and are consistent with national priorities. We are committed to achieving that balance.

Mr. Stratton. What was the technical or programmatic justification for OMB to initially cut out all ICF funding?

Did you reclama ICF funding with the same enthusiasm that you did in the rest of the weapons program?

If you view ICF as just another piece of weapons program, why have you apportioned a 55 percent cut in ICF and only a 7 percent cut in the program overall?

General Hoover. Faced with very severe budget constraints we felt it is necessary to make tough priority choices regarding the level of funding assigned to Inertial Confinement Fusion. The Inertial Confinement Fusion program is a weapons research program that will continue to make significant contributions to the weapons program technology base which supports such activities as SDI. We believe that Inertial Confinement Fusion should "compete" in the overall nuclear weapons research and development program rather than retaining a separate status. In this mode, the exact amount devoted to any specific research and development activity, such as Inertial Confinement Fusion, will be determined by laboratory directors after authorizations and appropriations.

Mr. Stratton. General Hoover, did you support General Withers' decision to distribute the remaining $70 million in ICF without regard to technical accomplishment and without regard to impacts at the laboratories or supporting contractors?

If the $70 million is not going to be spent to achieve specific technical milestones and goals, why should you be allowed to spend it at all?

General Hoover. In general, we feel that the Department must continue to foster a balance in the overall defense-related research and development effort at the laboratories, leaving it to the laboratory directors to assess their own priorities and determine the specific funding levels which best support departmental priorities within the constraints of their individual budgets. However, we do agree that there may be times to strengthen technical success. We do plan to review this decision at an appropriate time.

Mr. Stratton. General Hoover, you are the first Assistant Secretary that has not strongly supported the ICF program. Would you explain why this program is apparently not worthy of your support?

General Hoover. I do support the ICF program; it is a matter of overall priority. The Inertial Fusion Program has made many noteworthy contributions to the weapons research, development, and testing effort and promises to contribute to an inexhaustible energy source for the next century. As part of the overall research and development technology base at the laboratories, it will continue to receive the strongest support allowable within the limits of budget and consistent with departmental priorities.

Mr. Stratton. The NOVA facility was just completed at a cost of $176 million. Why have you split the ICF funding such that this facility must be closed? Did your technical staff in the Office of Inertial Fusion recommend this funding split? What split did they recommend?

General Hoover. When it was decided to place all IF activities within the weapons research, development, and testing effort, various technical and programmatic options were considered to best support both weapons research and inertial fusion. We feel that the determination to leave apportionment of laboratory funds to the discretions of individual laboratory directors will allow NOVA to be funded so that it can be operated effectively for both weapons and inertial fusion experiments.

Mr. STRATTON. Can you explain the rationale behind cutting LLNL by 67 percent and KMS Fusion by 60 percent, when the University of Rochester is not cut at all, and Sandia is cut by only 25 percent?

What are the technical milestones that go with such a capricious allocation of funds, or are you just spending the money to spend it?

If you expect the laboratory directors to allocate the ICF money, why did you not proportionately allocate the $70 million to all participants? Certainly that is more rational than your nearly random distribution.

General HOOVER. A $70 million budget places severe constraints on available options. Our rationale for establishing the requested budget included a modification of the balanced laboratory level of effort concept, which has been used to manage the weapons research and development program for many years, as well as factors such as laboratory and contractor impact, facility capability, and technical expectations. Under this approach, Sandia will receive approximately one-third less. The University of Rochester, however, will receive a less severe cut. This is appropriate because they are not able to draw upon other bases of support such as weapons research and development.

Again faced with new budget constraints and program priorities, we anticipate there will be some changes to previous program planning. Subsequent to completion of the Congressionally mandated review of the Inertial Fusion Program, we will again reassess and realign our milestones as appropriate.

Mr. STRATTON. General Withers, you and Secretary Hoover have said much about laboratory balance. Don't you think laboratory technical excellence is more important? How will excellence flourish under your stewardship if laboratory balance is always rewarded over laboratory accomplishment?

General WITHERS. We must do both. In general, laboratory balance is the rule, with laboratory directors assessing technical priorities. However, there are cases where we may wish to strengthen technical success.

Mr. STRATTON. The Honorable Donald P. Hodel instructed the Assistant Secretaries and Director, Office of Energy Research, in a memorandum entitled "Guidelines on Relationships between the Department of Energy and Universities and Colleges" that "Reasonable continuity of university projects should be maintained. Programmatic and administrative attention to timely award renewals and the use, where appropriate, of multiyear awards will help minimize adverse and burdensome effects on faculty and students and on the institution. Abrupt changes in the funding and monitoring of ongoing university research projects should be avoided wherever possible."

What have you done to carry out this directive with respect to the University of Rochester's role in the Defense Inertial Fusion Program? How much of the total FY 1986 Inertial Fusion budget is to be allocated to the University for Laboratory for Laser Energetics operations, excluding user funds for the National Laser Users Facility?

General WITHERS. The Department has taken every effort to comply with Mr. Hodel's directive regarding reasonable continuity of university projects. The Department has consistently sought to avoid abrupt changes in the Rochester effort; however, in an era of general budget austerity, even Mr. Hodel's guidance recognizes that universities must bear their fair share.

The old contract with the University of Rochester was replaced upon expiration in a most timely fashion by a new cooperative agreement. Although multiyear funding was not available and no multiyear commitment was made, the Department did provide as part of the cooperative agreement its planning budget at the time of negotiation to Rochester to provide guidance for Rochester's outyear planning. (This planning information is frequently confused with a contractual commitment, which it is not.)

As to the requested FY 1986 budget, the University of Rochester has been allocated $5 million, inclusive of National Laser Users Facility user funds. The Office of Inertial Fusion is funding the support laboratories directly to maintain continuity since they have no other weapons research and development funds.

Mr. STRATTON. We understand that the Director, Office of Inertial Fusion, wrote to the University of Rochester on November 20, 1984, and stated that "The amounts shown as proposed planning budgets in the Cooperative Agreement were included by the contracting officer to represent a level-of-effort over the 3-year period."

Do you believe that DOE will be able to honor this commitment?

General **Withers**. The Department of Energy has a policy of honoring its contractual commitments, insofar as Congressional funding authorization and allocation allow. In the case of inertial fusion support at the University of Rochester, the requested level of funding is consistent with the Department's long-term goals for the advancement of inertial fusion research and development.

In the specific case of the planning figures in the Cooperative Agreement, to which the cited quote refers, the Cooperative Agreement clearly states "The following planning budgets are provided for information purposes only." During the negotiation of the Cooperative Agreement, the DOE negotiator emphasized to the University of Rochester negotiator that these figures are only for guidance in planning and do not represent a contractual commitment on the part of the Federal Government. As always, they are subject to appropriation by the Congress.

Mr. **Stratton**. In Senate hearings in 1984, Dr. Schriever stated that "In the laser fusion area, the most important breakthrough has been the development of efficient wavelength conversion, now being implemented on NOVA and OMEGA."

Is the Department's budget request consistent with taking advantage of the wavelength-converted OMEGA and NOVA systems?

General **Withers**. The Department's program will take advantage of the wavelength-conversion technique in the OMEGA and NOVA systems. The Department's FY 1986 research and development base budget provides funding to contribute to the operation of the OMEGA and NOVA laser systems. Proper utilization of NOVA is one of the highest priorities for the FY 1986 budget request. Further, it is our intent that Rochester will be supported at a viable level for OMEGA research and NLUF support.

Mr. **Stratton**. We understand that the high-density milestones for the Rochester OMEGA system require cryogenic target capability. Who will provide this target capability and what assurance is there that it will be provided?

General **Withers**. Although there is reasonable expectation that cryogenic targets would enable higher densities than noncryogenic targets, it has not been demonstrated that cryogenic targets are essential to high densities. In anticipation of the possible need for such a capability, the Department has contractually funded KMS Fusion, Inc. in FY 1985 to develop, construct, and deliver a cryogenic target system to the University of Rochester; this system is on schedule and expected to be complete (delivered) by the end of 1985. The requested FY 1986 budget is not expected to delay delivery of this cryogenic target capability for OMEGA.

PREPARED STATEMENT OF DR. STEPHEN O. DEAN, PRESIDENT, FUSION POWER ASSOCIATES

INERTIAL CONFINEMENT FUSION

In light of the outstanding record of accomplishments of the inertial confinement fusion program, it is incredible to me to witness the short-sighted budget cutbacks imposed on this program within a DOE defense budget which is expanding enormously.

DOE proposes to cut the inertial fusion program in half and to distribute the resulting budget in a mindless manner. I consider the DOE action to be technically and managerially irresponsible.

As shown in the figure below, the inertial confinement fusion program has been making systematic progress towards the achievement of its goals. In addition, during the past decade and a half the inertial confinement fusion community has created, cost-effectively, the most exciting new advanced technology since the space program and has also provided the technical underpinnings of important new programs such as laser isotope separation and directed energy weapons. These accomplishments have been made in spite of unduly severe, DOE-imposed, secrecy restrictions which have hampered the exchange of information among the scientific community.

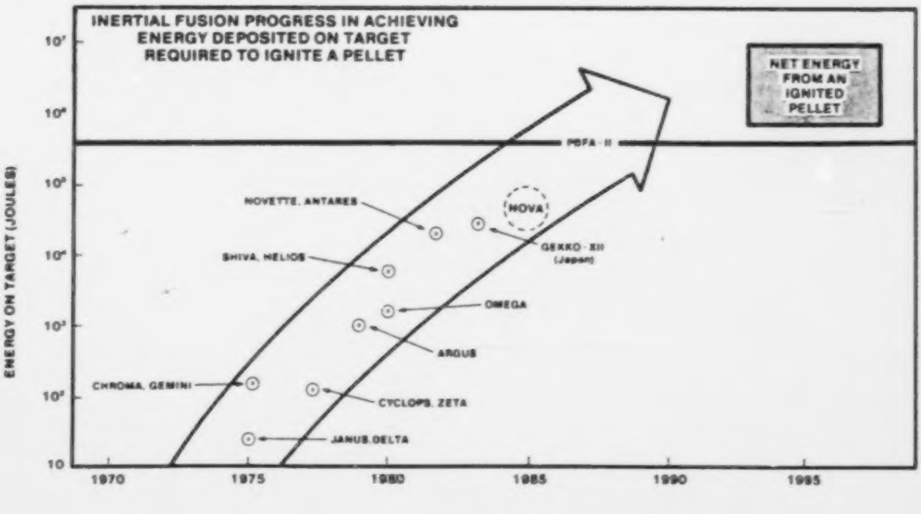
The proposed decimation of the inertial fusion program is a potential tragedy in-the-making on a grand scale. At one point in negotiations, DOE and OMB proposed killing off the program entirely. I believe that even the unclassified literature demonstrates convincingly that fusion pellet ignition is within reach. The myopia that would lead the Executive Branch to propose such a tragedy is beyond comprehension.

Further, the DOE action pre-empts the activities of the National Academy review of inertial fusion that was mandated by the Armed Services Committee last year. I believe that the result of that review will be a strong endorsement of the accomplishments and promise of the program.

The inertial fusion program is at the cutting edge of military applications research on the study of weapons physics in the laboratory. But, in addition, the program holds out the very real promise of civilian applications also. The Board of Directors of Fusion Power Associates has been concerned for several years that the military sponsors of the research at DOE have taken too narrow a view in evaluating the role of inertial fusion for both military and civilian purposes. This concern led our Board of Directors to adopt the following statement of views on the subject:

"There have been considerable pressures exerted on ICF program managers to downplay studies aimed at energy applications of inertial fusion. Fusion Power Associates believes that to respond to these pressures by reducing the minimal ongoing studies of potential energy applications of ICF is not in the national interest. Military research and development has historically led to many important contributions to the civilian sector and to the economy. Government sponsors should be proud of, and encourage, these connections. Permitting a reasonable percentage of the ICF funding to continue to be spent on energy applications is the best way to ensure that the nation ultimately derives full benefit from the ICF program."

For several years now the Department of Energy has systematically reduced their requests for operating funds in this program relative to prior years. Only the foresight and vision of the Congress, which has regularly added money to the DOE request, has kept us from losing considerable numbers of talented scientists from this very productive program. I urge the Congress to continue to provide the support necessary to maintain momentum, progress and enthusiasm within the inertial confinement fusion program.



PREPARED STATEMENT OF ALEXANDER J. GLASS, PRESIDENT, KMS FUSION, INC.

INERTIAL CONFINEMENT FUSION RESEARCH

Summary

The 1986 Administration budget proposal calls for a 60 percent reduction in funding for the Inertial Confinement Fusion (ICF) program. With the Nova facility starting operation, and significant technical progress in the classified portion of the program, we feel that such drastic budget reductions are counter-productive, and will deprive the country of the benefits of the billion-dollar-plus investment made to date in the ICF program. KMS Fusion urges the committee to restore funding for the ICF program to a productive level.

KMS Fusion plays a unique role in the ICF program, as the primary source of classified physics data supporting the Nova experiments program, and as a major supplier of target technology. We propose to modify our laser facility, Chroma, to increase our capability to conduct ICF target physics and x-ray laser experiments. This enhancement will provide the program with a low cost, high data-rate facility for physics data, and will free up the $180 million Nova facility for the high-value ICF and weapons physics experiments for which it is uniquely suited. KMS Fusion

requests a 1986 budget of $15 million in operating funds, and $4.6 million in capital equipment, to carry out the proposed facility modification, while continuing our research program.

The Inertial Fusion Program

Fusion is the process which generates the sun's radiant energy, and which gives the hydrogen bomb its awesome power. In fusion, the fuel, consisting of the heavy isotopes of hydrogen (deuterium and tritium), is heated to a temperature of 100 million degrees, hotter than the sun's interior. At this temperature, the hydrogen nuclei fuse together to form helium, with an attendant release of energy. The fuel must be confined, i.e., held together long enough so that the energy released exceeds the energy invested to heat the fuel to the reaction temperature.

Inertial Confinement Fusion (ICF) is one approach to confining and heating fusion fuel. Energy from a powerful laser or particle beam is concentrated on a spherical shell containing the fuel. The fuel is heated and compressed in the process, until thermonuclear conditions are achieved at the center, igniting the fusion reaction. The surrounding compressed fuel is then ignited by a propagating thermonuclear burn wave, releasing energy from the fusion reaction.

Inertial Fusion research has been supported by the Congress for over a decade, with two objectives. In the near term, the ICF program provides information about thermonuclear physics which is of vital importance to the nuclear weapons program. In the long term, ICF is viewed as an alternative path to harnessing fusion as a source of energy. In the Department of Energy, the ICF program is administered by the Office of Inertial Fusion, under the overall direction of the Assistant Secretary for Defense Programs.

The hydrogen bomb demonstrates that inertial fusion is feasible on a large scale. The objective of the ICF program is to demonstrate that thermonuclear ignition can be achieved on a laboratory scale, driven by a laser or particle beam. The ICF program has constructed three major facilities to assess the feasibility of inertial fusion. These are Antares, a 40 kilojoule carbon dioxide laser at the Los Alamos National Laboratory, Nova, a neodymium-glass laser producing 100 kilojoules of infrared light, at the Lawrence Livermore National Laboratory, and PBFA-II, a light-ion beam facility currently nearing completion at the Sandia National Laboratory.

Last year, Congress called for a high-level review of the ICF program by the administration. A prestigious panel of scientists has been assembled, under the auspices of the National Academy of Sciences, to conduct this review. They met here in Washington early in March, and heard presentations from the Office of Inertial Fusion, and from each of the six participating laboratories. The panel will visit each of the ICF laboratories in the weeks to come. The NAS review committee is scheduled to submit an interim report this summer, and a final report by February 1986.

The Nova Project

In 1979, the Department of Energy approved the construction of the Nova laser at LLNL. Nova was originally conceived as a 20-beam, neodymium-glass laser, capable of generating 200-300 kilojoules of infrared light in three-billionths of a second (3 nanoseconds). However, DOE only approved construction of a ten-beam system, designed to produce 100 kilojoules of infrared light, but with frequency conversion capability, to convert the output to visible light. The total project cost for Nova is approximately $180 million. Nova can operate either with two beams or ten, and is equipped with two experimental target chambers.

There are two basic approaches to driving an inertial fusion target. The laser light can impinge directly on the target (direct drive), or can be converted to x-rays in an enclosure ("hohlraum") containing the fuel mass, and the x-rays used to drive the target (radiation drive). Radiation-driven targets offer better uniformity of illumination than direct-drive targets, but sacrifice efficiency at lower laser energies. Both approaches are currently under investigation in the ICF program. Nova experiments will emphasize the radiation-driven approach, which also provides important information on the physics of nuclear weapons.

In order to ignite the fusion reaction, it is necessary to heat the fuel to 100 million degrees, and to compress it to 1000 times the density of liquid hydrogen (1000 × L.D.). Nova experiments are unlikely to achieve both conditions simultaneously. However, it is expected that targets will be compressed to 500 × L.D. in the first year of Nova's operation, at a temperature lower than that required for ignition. Subsequent Nova experiments are expected to achieve 1000 × L.D., at sub-ignition temperatures. Data from the Nova experiments, taken together with information obtained from other sources in the program, will define the driver and target requirements for both ignition and high-gain targets. These experiments will thus provide the basis for evaluating the applicability of ICF to both its military and energy objectives, in the 1986–1987 time frame.

KMS Fusion's Contributions to the ICF Program

KMS Fusion is located in Ann Arbor, Michigan, and is the only private participant in the ICF program. KMS Fusion has played a major role in the development of inertial fusion. The company began fusion research in 1971. Ten years ago, the world's first successful demonstration of laser-produced thermonuclear reactions took place at KMS Fusion's laboratory, in Ann Arbor, Michigan. Since then, the company has contributed many other innovative "firsts" to the program. KMS Fusion was the first to carry out experiments with short wavelength light, a technique which has been subsequently adopted world-wide. The company pioneered the use of frozen (cryogenic) fuel in ICF targets, a complex technique generally acknowledged to lead to improved target performance. Until 1983, when LLNL conducted its first cryogenic target series, KMS Fusion was the only laboratory in the world to carry out cryogenic experiments. KMSF scientists had demonstrated, in 1981, that cryogenic targets perform better than gas-filled targets. Most recently, in 1983, the company developed a multi-frame holographic interferometer for visualizing the evolution of material surrounding the surface of a target. This instrument is capable of providing stop-motion images in a fifty-billionth of a second. Up to four such images can be recorded during each experiment, which lasts less than a billionth of a second.

The company is a major supplier of targets and target components within the ICF program. The target fabrication effort comprises roughly half of the company's activities. This effort supports the internal research program at KMS Fusion, and also produces target materials and components for the other participants in the program. Several European laboratories also buy the submillimeter-sized glass Microshell® fuel containers that KMS Fusion has developed for fusion use. In addition to target fabrication, the company is pursuing long-term research to develop the large targets needed for the critical experiments to be performed on Nova. These targets involve several techniques and technologies developed at KMS Fusion, including cryogenic fuel, and various new target materials.

In addition to the company's efforts in material science and target fabrication, KMS Fusion operates a highly productive experimental facility, the Chroma laser. Chroma is a two-beam laser, capable of producing up to 800 joules of infrared light in a pulse of one billionth of a second duration. This energy can be efficiently converted to visible light, which couples more effectively to the fusion target. The laser is equipped with a pulse stacker, which allows us to synthesize pulses of arbitrary temporal shape, an important parameter for optimal target compression. The Chroma laser is outfitted with three experimental areas. This allows us to carry out one set of experiments, while setting up other experimental configurations. At present, one experimental area is devoted to a unique optical system, devised and patented by KMS Fusion, which enables us to illuminate a target uniformly from all directions, using the light from the two beams of Chroma. Either gas-filled or cryogenic targets can be imploded in this target chamber. The other experimental areas are used to explore the physics of radiation-driven targets, and to conduct other experiments on laser-matter interaction.

KMS Fusion's Unique Role in the ICF Program

In 1979, KMS Fusion was designated as a support laboratory for glass laser experiments, and since then, its efforts have been closely coordinated with those of the lead laboratory for glass laser experiments, LLNL. About 850 experiments were carried out on the Chroma laser facility in 1984. KMS Fusion is the only laboratory other than LLNL conducting glass laser experiments on radiation-driven targets. With its highly flexible experimental facilities, operating at a high data rate, and backed up by a full spectrum of capabilities in data analysis, target design, target fabrication and diagnostic instrumentation, KMS Fusion has emerged as the primary source of supporting physics data for the "flagship" facilities at LLNL, Nova, and its predecessor, Novette.

Experiments are carried out at KMS Fusion by our scientific staff, often with the involvement of researchers from LLNL and other laboratories. Over the last two years, LLNL-KMSF teams have conducted experiments on the use of x-ray spectroscopy to diagnose the density and temperature of target plasmas, the effect of classified target construction on hot electron generation, and the characterization of x-ray sources used for target analysis. In preparation for the historic experiments conducted at LLNL last year, which demonstrated soft-x-ray laser action for the first time, joint LLNL-KMSF-NRL experiments were conducted on the Chroma facility to establish which candidate materials were most likely to succeed in an x-ray laser experiment, and how the plasma cloud surrounding the target would evolve. Our internal research program is also directed toward providing the physics and technology data base required for the proposed Nova experiments. During the past two years, we have measured the transport of energy in target plasmas, using spherical illumination, which creates nearly one-dimensional target conditions which are much more readily analyzed; and we have developed and applied novel diagnostic techniques to measure the distribution of energy and the occurrence of deleterious plasma processes in hohlraum targets. We have continued to pioneer the development of cryogenic targets, and have recently solved the difficult problem of stabilizing a uniform layer of liquid D-T in a large, Nova-sized target.

KMS Fusion maintains a small effort on the development of the Oxygen-Iodine laser. If energy can be extracted from that laser efficiently in a short pulse, it could provide the required combination of short wavelength, high repetition rate and high efficiency required for all ICF applications. Over the past two years, we have received support for further development of this laser from NASA, and the Air Force Weapons Laboratory.

We requested funds in FY 1985 to initiate the design and construction by KMS Fusion of a cryogenic target facility for the University of Rochester. During the summer of 1984, the University of Rochester asked us to accelerate that project, to allow us to deliver the finished target assembly to them early in Calendar Year 1986. By redirecting a portion of our program funds, we were able to satisfy their request. Our cryogenic technology will be installed on the Omega laser facility at the University of Rochester during the first quarter of 1986, and will be ready for operation at that time.

KMS Fusion's 1986 Budget Request

As in previous years, all the participants in the ICF program look to Congress to restore program funds deleted in the Administration's budget request. At the $70 Million level proposed by the Administration, we cannot operate the facilities that exist in the program, and therefore cannot progress toward the program goals. It is doubly ironic that we are confronted by the spectre of a disastrous budget cut just as the Nova facility starts operation, and as the National Academy's review committee starts its deliberations. For several years, KMS Fusion has testified before Congress that a modest increase in KMS Fusion's funding would enhance the productivity and cost-effectiveness of the ICF program, especially in the use of its premier facility, Nova. As we have noted in this testimony, our facility, with its flexibility, full spectrum of supporting services, high data rate and low operating cost, is ideal for conducting those experiments which do not require the full capability of the facilities at the national laboratories, but which provide the data base needed to ensure the success of the high-value experiments carried out on the large facilities.

In 1986, we are proposing to modify our laser, Chroma, to increase its output from its current level of 500 joules of visible light to 2500 joules, in a one nanosecond pulse. We have provided the committee with a detailed proposal for this modification, which is a classified document. We request that our proposal, which has been submitted to the committee staff, be incorporated into the record. This modification will entail a one-time capital cost of $4.6 million. In addition, we are requesting operating funds of $15 million.

We feel that this modification is extremely important in view of the climate of cost consciousness which surrounds these hearings. The modified Chroma laser would continue to operate at a shot rate of 6–10 shots per day, with only minor increases in operating costs. At a rate of 850 shots per year (our actual 1984 shot rate), and a five-year lifetime, with an operating cost estimated to be $4 million per year, the total cost of an experiment on the modified Chroma will be about six thousand dollars. For the sake of comparison, the corresponding figure for a Nova shot will be over $200 thousand.

Of course, Nova will produce twenty times the energy of the modified Chroma. As a result, LLNL will be able to carry out experiments which cannot be conducted on any other facility. These must be high-value experiments in target implosion physics, weapons physics, and weapons effects. In our classified proposal, we show that many of the supporting experiments involving energy transport, laser-plasma interactions, and x-ray laser development can be carried out on Chroma at far lower cost, making Nova available for those experiments to which it is uniquely suited.

We propose to continue operating Chroma while the modification is underway. We do not expect the changeover to the modified system to interrupt our experimental schedule for more than about one month. We shall continue our work on target fabrication, supplying targets and target components to the other laboratories in the program, on diagnostic development, and on the development of the Oxygen-Iodine laser.

In a period of heightened cost-consciousness, the true measure of economy lies in enhanced productivity. Cutting the program funding in half is disastrous, because it reduces the productivity to zero. The funding level which we request will truly be cost-effective, both by increasing the utility of the KMS Fusion facility, and by enhancing the productivity and availability of the Nova laser.

Prepared Statement of Robert L. McCrory, Director, Laboratory for Laser Energetics, University of Rochester, Rochester, NY

SUMMARY

The University of Rochester's Laboratory for Laser Energetics (LLE) has completed its original five year agreement with the U.S. Department of Energy (DOE). Rochester was responsible for one of the most important breakthroughs in laser fusion, the development of high-efficiency wavelength tripling. The DOE has executed a new planned $23,468,000 three-year Cooperative Agreement with the University for the LLE (1) to continue research for the Defense Inertial Confinement Fusion program, using the frequency-converted OMEGA laser system, (2) to continue operation of the National Laser Users Facility (NLUF), and (3) to continue to educate students in the fields of fusion, engineering, optics, and physics. In order to continue a level-of-effort program (consistent with FY85), a total authorization (which includes $750,000 for outside users of the NLUF) of $8,514,000 is required.

INTRODUCTION

The Laboratory for Laser Energetics of the University of Rochester occupies a unique position in the U.S. Defense Inertial Fusion Program. Established in 1970 as a center for investigation of intense radiation with matter, the Laboratory has the four-fold mission (a) to conduct basic physics experiments and research in support of the national short-wavelength laser program as well as demonstrating the feasibility of direct-drive laser fusion, (b) to provide graduate and undergraduate training in electro-optics, high-power lasers, high-energy-density physics, plasma physics, and nuclear fusion technology, (c) to operate the National Laser Users Facility, and (d) to conduct research in advanced technology areas related to high-energy-density phenomena.

LLE continues as an inertial fusion facility with significant non-federal funding, too. From its inception through 30 September 1984, more than $52.7 million of industry, university, and state funds have leveraged the $64 million federal investment. In addition to its key role in the U.S. Defense Inertial Fusion Program in laser-matter interaction experiments that support of the national short-wavelength laser effort, LLE is part of the University of Rochester and educates students.

EDUCATION

From its beginning in 1970, LLE has made the education of students one of its most important missions. This LLE mission is unique among the Inertial Fusion Program participants. The students come from departments and colleges within the university. While the largest number of graduate students come from the Institute of Optics and the Department of Mechanical Engineering, students from the Departments of Physics, Chemistry, and Electrical Engineering have been and will continue to be educated at the laboratory.

More than 200 students have received graduate and undergraduate training at LLE. Through June 1984, 41 students received Ph.D. degrees while working at LLE; 22 graduate students are currently engaged in Ph.D. research at the laboratory. Current graduate student research ranges from studies in hydrodynamics and parametric instabilities in plasmas to fundamental studies in nonlinear optics.

Graduates of the UR/LLE program are making significant contributions in a number of national laboratories, in industry, and in the nation's major research universities.

The laboratory is actively recruiting new students for graduate and postgraduate study and research in areas important to the Defense Inertial Fusion Program and to advanced technology development in general. As a result of a nationwide recruiting effort, more than 1000 responses have been received from potential applicants to the graduate research programs at LLE. Under the recently consummated DOE/

LLE three-year Cooperative Research Agreement, LLE plans to increase the number of graduate students supported.

THE UNIVERSITY OF ROCHESTER PROGRAM IN LASER FUSION

The University of Rochester has been involved in fusion research since the mid-1960's. It has pursued an expanded research program in conjunction with industry since 1972 at the Laboratory for Laser Energetics. The U.S. Defense Inertial Fusion Program supports laboratory experiments which will determine the critical physics and engineering issues necessary to determine the scientific feasibility of igniting small fusion fuel masses. Present experimental strategy calls for the use of laboratory drivers to acquire data which will help to unambiguously determine the marginal ignition boundaries for small fuel mass systems. These data are vital to the nation's nuclear weapons physics research, and are also necessary in developing the potential for inertial fusion to become an attractive energy source for the future.

In the early 1970's, the University funded the fusion research effort almost exclusively through its industrial sponsors. As the program evolved from a bench-scale effort to a laboratory scale, the University elected to meet a national goal of laser fusion feasibility research using the joint support of the Federal Government, industry, utilities, the State of New York, and the University of Rochester. Approximately $117 million have been invested in the program since 1972. Approximately 46% of the total has come from non-federal sources. In effect, at Rochester a new and different kind of "national laboratory" has been created.

The fiscal year ending September 1984 (FY84) marked a milestone in the history of the Laboratory for Laser Energetics. It was the fifth year of the initial five-year research contract with the U.S. Department of Energy.

In the five years represented by the DOE/LLE supporting research program, 15,341 shots were recorded by the 24-beam, 12-terawatt OMEGA and one-beam, 1-terawatt GDL laser systems. More than 6000 of these were on-target shots. This represents one of the most extensive data bases on 1054-nm and 351-nm laser interaction with matter.

The University of Rochester was first to demonstrate and patent the high-efficiency, frequency-tripling process. Dr. Schriever, Director of the U.S. Department of Energy Office of Inertial Fusion has stated: [1]

"In the laser fusion area, the most important breakthrough has been the development of efficient wavelength conversion, now being implemented on NOVA and OMEGA."

The full OMEGA system is now fully frequency-converted to 351 nm. The OMEGA system, with its high repetition rate capability and reliability will enable accumulation of crucial data necessary to understand the physics scaling laws of inertial fusion using short-wavelength lasers in a symmetric ("direct-drive") illumination geometry. Understanding the physics scaling laws means we must verify predicted target performance as target size, laser energy, and wavelength are varied. Rochester's critical role in the National Program will minimize the technical risk associated with the Inertial Fusion Program as well as provide an alternative approach to laser fusion.

During the past year several major experimental campaigns were carried out on OMEGA. These campaigns investigated (a) illumination uniformity, (b) coronal physics, (c) energy transport and ablation, (d) high-Z plasma dynamics, (e) atomic physics and x-ray laser physics, and (f) fusion diagnostic development. A number of these experiments were carried out in collaboration with other inertial fusion laboratories.

The results of these experiments, reported in LLE's FY 1984 Annual Report, [2] give renewed promise for the successful demonstration of direct-drive laser fusion. Direct drive is an important research tool needed to advance inertial fusion research, and provides a wealth of high-energy-density physics data. Atomic physics, laboratory astrophysics, x-ray laser physics, and x-ray generation are a few of the areas that have benefited from research devoted to understanding the basic physics of laser-matter interaction.

Work at LLE and elsewhere has shown that the illumination uniformity required for high-convergence implosions can be achieved with laser technology already developed. Short-wavelength, laser-matter-interaction experiments have confirmed the expectations of high absorption, low preheat, and high ablation pressure.

---

[1] S. HRG. 98-1175, Hearings before the Subcommittee on Energy Research and Development of the Committee on Energy and Natural Resources, United States Senate (March 5, 12, 20, 22, April 5 and 24, 1984), p. 836.

[2] University of Rochester, Laboratory for Laser Energetics Annual Report, DOE/DP/40124-67 (January, 1985).

The short-term (1- to 3-year) objective of the LLE program is to demonstrate sufficient drive uniformity with the 24-beam OMEGA system at 351 nm to compress targets to densities in excess of 20 g/cm3. The OMEGA system converted to full 24-beam, 351-nm operation has begun operations at the 1500- to 2000-J level. It is expected that densities of the order of 10 g/cm3 can be achieved on OMEGA by 1986 using gas-filled targets. Improvements in illumination uniformity and cryogenic targets are expected to produce higher densities, of the order of 20 g/cm3 by mid-1987.

OPERATION OF THE NATIONAL LASER USERS FACILITY

A second unique characteristic of the Rochester program is the National Laser Users Facility (NLUF). Since 1979, 42 proposals have been approved for the facility. In addition to investigations in the general area of inertial fusion, approved experiments have also included investigations in plasma physics, x-ray laser development, XUV spectroscopy, and instrumentation development. Researchers from Brigham Young University, Los Alamos National Laboratory, the National Bureau of Standards, the Naval Research Laboratory, the Goddard Space Flight Center, Physics International, Inc., Polytechnic Institute of New York, University of California (Davis), University of California (Los Angeles), University of Connecticut, University of Illinois, University of Maryland, University of Pennsylvania, University of Texas, and Yale University have participated in NLUF experiments.

PROGRAM FUNDING AND MANAGEMENT

On October 1, 1985, the Department of Energy executed a new three-year Cooperative Agreement with the University of Rochester. The new agreement funds the Laboratory for Laser Energetics at a planned $23,468,000 over three years ($7,428,000 for FY85, $7,764,400 for FY 86, and $8,275,600 for FY87). These agreement amounts do not include funds which are provided directly to the NLUF users. The dollar amounts were the result of a series of negotiations with the Department of Energy, the last of which occurred in July, 1984.

The negotiated Agreement with the Department of Energy establishes Rochester's program as a level-of-effort program (consistent with FY85) for FY86 and FY87. The agreement funds 63.6 man-years per year for each of the three years. The equipment funded in FY85 includes $704,000 for the blue conversion. For FY86, equipment purchases are anticipated for replacement parts necessary to operate the system ($695,000), and diagnostic equipment required for the experimental campaigns ($437,000).

In order to operate the newly converted system and conduct the experiments which will produce high densities and temperatures in laser-driven inertial fusion capsules, as well as to continue its mission to educate students and operate the NLUF, LLE requires total funding of $8,514,000 for FY86.

We expect that the laboratory will continue to play an important role in the Inertial Fusion Research Program, in the training of the nation's scientific leaders, and in the development of advanced technology.

AFTERNOON SESSION

Mr. STRATTON. The subcommittee will come to order.

Our first witness is the Hon. Butler Derrick, member of the House Rules Committee, from South Carolina, and one who is extremely interested in nuclear systems and nuclear energy. Mr. Derrick, we appreciate your appearing before the subcommittee, and we are delighted to have your statement in any particular form you want to give it.

STATEMENT OF HON. BUTLER DERRICK, A REPRESENTATIVE FROM SOUTH CAROLINA

Mr. DERRICK. Thank you, Mr. Chairman. I appreciate your kind remarks.

The Savannah River Plant is located in my district. In addition, it is the largest payroll in the State of South Carolina. We are very pleased to have it and very pleased at the excellent job they have done down there over the years.

Mr. Chairman, I thank you for providing me with time today to appear before you and your colleagues on the Subcommittee on Procurement and Military Nuclear Systems regarding the fiscal year 1986 funding requests submitted for the Department of Energy's atomic energy defense activities.

My comments this afternoon will address issues primarily related to the new production reactor project, the "next-generation" nuclear reactor for production of materials for the U.S. Nuclear Defense Weapons Program.

At the outset, Mr. Chairman, I should note that it is my understanding that the Department of Energy did make some determination about the future course of this project yesterday. I was apprised of this action yesterday evening, through secondhand sources, although I understand the information was selectively released to certain Members of Congress. I assume the committee has been briefed on this matter in full detail, and would welcome any information that may be available. On the basis of the information that I have reviewed from this morning's newspapers from South Carolina, it is claimed that a scaled-down new production reactor is expected to be constructed at the Savannah River Plant somewhere around the turn of the century.

Mr. Chairman, from the exchange of correspondence and colloquy we had on the House floor last year, you are no doubt well aware of my interest and concerns regarding the new production reactor.

Moreover, I have come to the conclusion that the Department of Energy, and specifically former Secretary Hodel, used public statements regarding decisions related to the siting for this reactor for partisan political purposes over the course of the last 2 years. Specifically, the Secretary's announcement of June 11, 1983, that an environmental impact statement for the new production reactor would be conducted at the Idaho National Engineering Laboratory was originally announced at a press conference held by the senior Senator from Idaho, and was an issue of considerable political impact during that Senator's re-election campaign.

At the same time, Secretary Hodel, in public statements made in the State of South Carolina, indicated that the new production reactor would not be located in South Carolina, because officials of my State were willing to challenge the Department's intransigent and legally indefensible position of refusing compliance with the preeminent environmental statute in the United States—the National Environmental Policy Act—on a separate ongoing project at the Savannah River Plant. This State action, as misinterpreted by the Secretary of Energy, led him to the conclusion that the State was no longer receptive to the Savannah River Plant, and that as a penalty for the State's involvement in a lawsuit against his Department, he would exact retribution by sending the new production reactor to another site.

Therefore, not only was the Secretary able to use this siting decision to the advantage of an incumbent Senator and chairman of the Senate Committee on Energy and Natural Resources, but he also attempted to point the finger at elected officials in South Carolina for creating an environment which the Secretary attempted to characterize as hostile to the interests of the Savannah River Plant.

Mr. Chairman, what has concerned me most about this entire situation and lead me to pursue this matter to the degree that I have is that in an affidavit filed in the U.S. District Court for the District of Columbia, on January 15, 1985, former Secretary Hodel stipulated, and I quote, that as early as June of last year, he had "determined that it would not be feasible to make a recommendation on any proposal for a new production reactor or its alternatives by mid-1985."

This decision, if made in June of 1984, occurred 1 full year after the Secretary had already stated his intention to perform an EIS on siting the new production reactor at the Idaho site. And if this decision not to move forward with the new production reactor was indeed made in June of 1984, why did it not become public information until January, 1985—2 months after a general election in which the issue figured prominently in State and local elections in both Idaho and South Carolina.

Mr. Chairman, as you are aware, I forwarded correspondence to the chairman of the full committee in late January, which provided greater detail regarding this situation. I request that my letter to the chairman of January 27, 1985, with enclosures, be entered into the record of this hearing.

Mr. STRATTON. Let me just ask the staff, do we have that?

Mr. DERRICK. They do, but I assure you I will provide them with a copy if they don't.

Mr. STRATTON. We would appreciate it.

(The following information was received for the record:)

BUTLER DERRICK
3D DISTRICT, SOUTH CAROLINA
AL [illegible]
ADMINISTRATIVE ASSISTANT
201 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-5301

COMMITTEES
RULES
BUDGET
SELECT COMMITTEE ON AGING

Congress of the United States
House of Representatives
Washington, DC 20515

DISTRICT OFFICES
POST OFFICE BOX 4126
ANDERSON, SC 29622
(803) 224-7401

DISTRICT MANAGER
BARBAPA GAINES

B FEDERAL BUILDING
211 YORK STREET, NE
AIKEN, SC 29801
(803) 649-5571

120 FEDERAL BUILDING
GREENWOOD, SC 29646
(803) 223-8251

January 27, 1985

The Honorable Les Aspin
Chairman
Committee on Armed Services
2120 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

This is to bring to your attention a critically important situation involving very serious implications for our nation's defense efforts, and to request appropriate action by your committee to fully investigate this matter.

As you may be aware, the U.S. Department of Energy (DOE) is presently involved in litigation regarding its failure to comply with provisions of the National Environmental Policy Act (NEPA) in connection with the expenditures of funds by the department to study the siting and construction of the New Production Reactor (NPR), the next generation nuclear defense materials production reactor. Specifically, three citizen organizations located in the states of Washington, Idaho, and South Carolina joined with the Natural Resources Defense Council in bringing suit against DOE Secretary Hodel for expending considerable amounts of Federal funds in preparation of making a siting decision for the NPR prior to conducting an Environmental Impact Statement (EIS) in compliance with NEPA.

In documents recently filed in The United States District Court for the District of Columbia in response to this suit, Secretary Hodel has indicated:

> ...it would not be feasible to make a recommendation on any proposal for a new production reactor or its alternatives by mid-1985. After careful consideration, I decided that the Department should instead devote whatever additional time proves necessary to reassess potential options for assuring future availability of nuclear material. Accordingly, I decided also that the commencement of preparation of an Environmental Impact Statement should be deferred until these options are more refined and it again becomes time to decide if and when steps leading to preparation of a proposal should begin.

For your information and review, I have enclosed a copy of Secretary Hodel's affidavit (Enclosure 1).

As the Representative of the area in South Carolina encompassing the Savannah River Plant (SRP)---the nation's premier nuclear defense materials production facility---I have been following this and related developments over the last year very closely. Moreover, I have become convinced that the DOE, and specifically Secretary Hodel, have used the NPR project as a political bludgeon over the last several months while being fully aware that it would not ultimately be necessary to meet our defense production needs, and therefore not constructed. I believe these tactics pose grave dangers to our commitment to production of nuclear defense requirements.

Specifically, it has become apparent that as a result of South Carolina's involvement in litigation to compel performance of an Environmental Impact Statement on another, unrelated project at SRP (the L-Reactor restart), statements were made by officials of DOE to the effect that South Carolina was no longer receptive to SRP and the nuclear defense weapons program, and that therefore the NPR would be located in Idaho. Such assertions fly in the face of any measure of reality or common sense, and were made primarily to assist candidates running for reelection in Idaho and to "punish" elected officials in South Carolina for the States' involvement in the L-Reactor litigation.

To fully detail this situation, it is necessary to understand the purpose and mission of SRP: recent actions and litigation involving the L-Reactor restart at SRP: and the history of the NPR. Each will be discussed separately below:

THE SAVANNAH RIVER PLANT

As you are no doubt aware, SRP is the premier and primary source of materials for our nuclear defense program. It is the source for production of both plutonium and tritium, as well as the site for the Defense Waste Processing Facility (the first large scale vitrification facility for liquid high level wastes). Moreover, SRP has amassed a dedicated and experienced workforce which is highly competent and skilled in the performance of these functions.

At present, three of the five reactors at SRP are in operation for the production of the materials noted above. In the late 1970's, when it became apparent that additional production requirements were necessary, I spoke with and won the support of then-President Carter for the restart of the L-Reactor at SRP as the most cost efficient way to meet these production requirements. The L-Reactor was one of SRP's reactors which operated from 1953 through the mid 1960's. It was shut down and placed in standby status during the 1960's due to decreased demand for the materials it produced.

THE L-REACTOR CONTROVERSY

Over the last several years, therefore, considerable efforts have been undertaken to rehabilitate the L-Reactor with the goal that it would have been restarted by October, 1983.

In preparation for restart, DOE performed an Environmental Assessment (EA), published in August, 1982. On August 20, 1982, the department issued a "Finding of No Significant Impact", which concluded:

> ...considering the previous impact in the area due to the operation of L-Reactor from 1954 to 1968, and viewed in the context of the physical setting and current use of the Savannah River Plant site, DOE has found that the impacts resulting from the resumption of L-Reactor operation should not be significant.

Moreover, the major issue in contention was the discharge of super-heated water in an on-site stream, the Steel Creek, the release of cesium into the Savannah

River, and the potential destruction of wetlands and habitats for certain endangered species. The Steel Creek had been used for discharge water during the reactor's prior service, but had considerably regenerated over the years. It is also critical to note that NEPA had been passed by Congress during the time between the reactor's initial operational period and the date of proposed restart.

This "Finding of No Significant Impact" was subsequently challenged by suit filed on November 8, 1982 by the Natural Resources Defense Council and several groups in and around South Carolina. Moreover, the plaintiffs in this action alleged that a full EIS had never been conducted on the L-Reactor, and the restart of the reactor was a major Federal action with significant environmental impacts which should trigger a full EIS review.

In January, 1983, the State of South Carolina, through the Office of the Attorney General, joined the suit pending against DOE. It was this action that precipitated much of the controversy which will be discussed below.

A series of field hearings were held in South Carolina by the Senate Armed Services Committee in early February, 1983, in hopes that the open public forum would provide adequate public input and review of available options short of a full EIS. I testified at these hearings and urged the parties to reach agreement on an expedited EIS process, which if then adopted, would have allowed restart on or soon after the scheduled restart date.

As a consequence of these Senate Armed Services Committee hearings, a second set of hearings were proposed to take place after public distribution of the hearing report from the February hearings, and with disclosure of how the reactor would be operated within the limits of the EA. These hearings, conducted from April through July, 1983, culminated in a three volume Hearing Report, again with the intention that the extensive documentation would negate the need for a full EIS proceeding.

In April, 1983, the State of South Carolina withdrew from the pending litigation as a result of the successful negotiation and agreement to a Memorandum of Understanding between DOE and the State under which the DOE committed to study several thermal mitigation options not included in the EA, as well as conduct various additional studies related to SRP operations.

Nevertheless, during the summer months of 1983, legislative language was incorporated into both the Fiscal Year 1983 Supplemental Appropriations bill and the Fiscal Year 1984 Energy and Water Development Appropriations bill which prohibited the expenditure of any further funds on restart activities until and unless DOE conducted an EIS in connnection with the restart.

Pursuant to this direction from the Congress, DOE announced on July 19, 1983:

> ...its intent to prepare an Environmental Impact Statement (EIS) pursuant to the Energy and Water Development Appropriations Act, 1984, and the National Environmental Policy Act (NEPA) of 1969, as amended,

to address the proposed resumption of L-Reactor operation at the Savannah River plant (SRP), Aiken, South Carolina.

Also, in August, 1983, the Federal judge hearing the case referenced above held that Federal law did require performance of an EIS in connection with the L-Reactor restart, and ordered a six month delay in restart pending completion of same by DOE.

A draft EIS was ultimately released in September, 1983 and the final EIS was issued in May, 1984. The Record of Decision, issued July 6, 1984, recommended restart of the L-Reactor "...after construction of a 1,000-acre cooling lake." The lake, or "mixing zone" will be constructed by impounding the Steel Creek. Water reentering the stream at the point of impoundment will meet applicable water quality standards.

THE NEW PRODUCTION REACTOR

Anticipating additional future production requirements, and the possible future decommissioning of reactors located at SRP, DOE appointed a blue ribbon panel, the Concept and Site Selection Advisory Panel (CSSAP, also referred to as the Glennan Panel) was requested:

> To provide the Department of Energy with recommendations on a concept and site selection for an NPR, based on proposed reactor concepts and sites to be furnished to the CSSAP. The major objective of the NPR is the production of tritium and other products to support the maintenance of the Nation's tritium and other products to support the maintenance of the Nation's nuclear weapons stockpile. The Panel will prepare a report evaluating and ranking the candidate reactor concepts and sites.

The panel was empowered, therefore, with responsibility to provide scientific recommendations on both the appropriate reactor design for the NPR as well as the most appropriate site for its construction and operation.

A copy of the CSSAP's Executive Summary is enclosed for your reference and review (Enclosure 2). The panel examined seven reactor designs and four candidate sites: Savannah River, the Hanford Site in Washington, the Idaho National Engineering Laboratory in Idaho, and the Nevada Test Site in Nevada.

After consideration of relevant information on these factors, the panel concluded:

> After evaluation of the concepts with regard to a number of important criteria, the Panel recommends the Zero-Electric-Power Heavy-Water Reactor (ZEPHWR) sited at Savannah River as providing the greatest assurance of meeting production goals.

Therefore, both the Savannah River reactor design, as well as the site, were chosen as the most appropriate for the NPR. In commenting on the Idaho site, which was ranked least favorably, the panel noted:

> The Idaho Site was judged to be less suitable because of not having a history of materials production and such additional factors as lack of barge access and concerns over local labor availability and on-site professional support.

Notwithstanding these recommendations, however, on August 11, 1983, Secretary Hodel announced that he had directed that an EIS be prepared on the suitability of construction of a heavy water production reactor at the Department's Idaho National Engineering Laboratory near Idaho Falls.

It is ironic that the DOE press material accompanying the Secretary's announcement cited the Glennan panel, but only so far as reactor design was concerned, as justification for their announcement. This material also indicated that the Hanford Site near Richland, Washington would also be studied. The Savannah River Plant, the preferred site of the Glennan panel, was not even mentioned as a potential site for the reactor (see Enclosure 3 for copy of DOE's press announcement, and related articles on same from South Carolina newspapers).

On the basis of the foregoing, therefore, I believe there exists very strong evidence that the public statements of the Secretary of Energy were used soley for political partisan purposes. Moreover, the above can be synthesized into the following:

- The State of South Carolina joined litigation against the Department of Energy to force compliance with NEPA, and specifically, to compel the preparation of an EIS in connection with restart of the L-Reactor;
- The Department of Energy resisted every effort to compromise on the EIS for the L-Reactor---and only agreed to perform same upon compulsion of an Act of Congress and by order of a Federal District Court;
- Retribution was taken by officials of the Department of Energy against the officials of the State of South Carolina for involvement in the L-Reactor litigation by announcement that the NPR would not be sited at the Savannah River Plant and would be sited at Idaho (it should also be noted that the Senior Senator from Idaho was running for reelection as well, and the initial statement that the reactor was to be sited in Idaho was made by the Senator);
- By sworn affidavit, and only in response to litigation, the Secretary of Energy has now acknowledged, some two months after a general election in which this was a highly charged issue, that the NPR is no longer an active project at the Department of Energy:

Mr. Chairman, the simple reality of the jobs and funding associated with such a project render it a very potent political prize if chosen to be used in that manner. In fact, the NPR did become a major political partisan issue during the fall campaign in South Carolina (Enclosure 4). I firmly believe that the information as related above provides very strong inferences of highly improper partisan activity in connection with this project which is critically important to our nation's defense.

As I have stated on every occassion I have spoken on this matter, all I seek is full and fair consideration of the Savannah River Plant in any decision on the NPR. Common sense and sound technical evaluation will point to the

Savannah River Plant as the only rational site for this project. Once the decision is made to move forward with this project, the site selection must be open, fair and void of political pressure and persuasion.

In closing, I believe it important to stress that the relationship between the Savannah River Plant and the State of South Carolina is as healthy as it was the first day of construction of the plant. Moreover, the Department of Energy and the DuPont Corporation have established an outstanding safety record at the facility, and have been a welcome and respected corporate citizen within our state. Despite the erroneous protestations of the Secretary of Energy, the resolve and commitment of the citizens and elected officials of South Carolina to the U.S. Defense program has not diminished. The State will, however, undertake appropriate actions to ensure the health and well-being of its citizens when there is failure to comply with appropriate Federal and State statutes.

The allegations made above, if accurate, serve only to undercut the reliability of our efforts to produce these materials in a safe and efficient manner. Therefore, I request that your committee undertake whatever investigation may be deemed appropriate in the circumstances to fully air and resolve these issues. A similar letter has been forwarded to the Honorable John Dingell, Chairman of the House Committee on Energy and Commerce, and I intend to make this correspondence available to Members of the Senate Committee on Energy and Natural Resources who will be conducting hearings in the near future on the nominations of Donald P. Hodel as Secretary of the Interior, and John S. Herrington as Secretary of Energy.

Thank you for your time and consideration in the above. I look forward to working with you and your committee on this issue, and if I may be of any further service to facilitate the same, please don't hesitate to let me know.

With kindest regards, I am

Respectfully,

BUTLER DERRICK
Member of Congress

D/ht
Enclosures

ENCLOSURE #1

UNITED STATES DISTRICT COURT
FOR THE
DISTRICT OF COLUMBIA

NATURAL RESOURCES DEFENSE COUNCIL, INC., ET AL. Plaintiffs v. DONALD P. HODEL, SECRETARY, U.S. DEPARTMENT OF ENERGY, ET AL., Defendants	Civil Action File No. 84-2149

AFFIDAVIT OF DONALD PAUL HODEL

I, Donald Paul Hodel, affirm and state:

1. I currently serve as Secretary of the Department of Energy, having been appointed by the President and confirmed by the Senate in 1982.

2. As Secretary of Energy I am head of the Department of Energy, an executive department whose statutory functions include all of the authority and responsibility under the Atomic Energy Act of 1954 for the research, development, design, testing and production of nuclear weapons determined by the President under

the Atomic Energy Act to be necessary for this Nation's nuclear defense capability.

3. This Department's responsibilities under the Atomic Energy Act include production of nuclear material necessary to meet the requirements of the Nation's nuclear defense capability. Those production requirements, in turn, stem from decisions made annually by the President regarding the necessary size and composition of this Nation's nuclear defense capability. These decisions are memorialized in guidance to this Department through the President's approval of the "Nuclear Weapons Stockpile Memorandum," commonly known as the "stockpile memorandum."

4. Production of the nuclear material and other components necessary to meet the requirements determined annually in the stockpile memorandum involves operation of various types of manufacturing and refining facilities. These facilities are part of the substantial plant and capital equipment that is owned by the United States and is devoted to meeting this Department's defense responsibilities under the Atomic Energy Act.

5. One type of nuclear material which this Department produces for the nuclear defense program is tritium. This material degrades relatively quickly, and, accordingly, continued production of tritium is necessary to maintain the capability of

the Nation's nuclear weapons inventory. Tritium ordinarily is produced by the use of a type of nuclear reactor termed a "production reactor."

6. Current tritium requirements are met through operation of production reactor facilities that were constructed in the 1950s at the Government-owned reservation known as the Savannah River Plant in South Carolina. While the service life of these facilities cannot be predicted with precision, it is entirely possible that these facilities will require replacement as early as the 1990s.

7. From a Secretarial perspective, the process to address such a concern is a gradually-evolving, complex endeavor requiring years between conception and completion with continual assessment and reassessment of existing operations, interactions with Congress, consideration of competing budgetary priorities, and coordination with overall Administration objectives. Once commenced, this process is not and cannot be cemented into a guaranteed schedule or result in completely predictable benchmarks leading inevitably to the exact facility originally conceived. Indeed, this case typifies the false starts that can occur during the early stages of a project of this potential magnitude.

NPR - "false start"

8. The Department in early 1980 identified a need for a new tritium production capability to ensure uninterrupted tritium production in the 1990s. When this need was identified, studies were conducted by and for the Department commencing after 1980 which suggested that construction of a new production reactor might be the favored option to pursue in order to assure this continued tritium supply.

9. As a result of these studies and discussion with staff of the Department, I became convinced that a new production reactor would likely become an essential element of our production capability in the 1990s. From my experience I was aware that such an undertaking would take a substantial number of years to complete all of the necessary steps in order to have the new production reactor on line in the 1990s.

10. In view of my impression of the long lead time necessary to accomplish this major capital project, I decided that the most expeditious method of proceeding was to commence the preparation of a proposal for a new production reactor at a specific site using a specific technology. Again, based on the studies and staff discussions, I chose as the reference case for analytical purposes, a new production reactor located on the DOE-owned Idaho site using the same technology, heavy water moderated reactor, as we currently employ in the production of tritium. Accordingly, I

directed that the steps necessary to commence the preparation of an environmental impact statement for the proposal be taken.

11. When I directed that the Environmental Impact Statement be prepared, knowing that the preparation of an Environmental Impact Statement closely complements the entire thought-process in recommending and deciding upon such a project, I envisioned that the Environmental Impact Statement and the process of preparing it would accomplish at least the following:

(a) Verify the need for a new production reactor by careful analysis of all of the reasonable alternatives to a new production reactor.

(b) Develop the cost, environmental and technical information necessary to enable me to make a specific recommendation for tritium production which I believed would be for a new production reactor at a specific site and with a specific technology. The Environmental Impact Statement would enable the submission of any such recommendation.

(c) Provide the information necessary to prepare a legislative proposal for inclusion in the Government's annual budget prepared pursuant to the Budget and Accounting Act and the Budget and Accounting Procedures Act which is necessary in order to attain the specific authorizing legislation contemplated by the Atomic Energy Act.

(d) Provide a publicly available document containing essentially all relevant factual information concerning the proposed project which would be useful to all decisionmakers involved in preparing the legislative proposal including myself and other members of the Executive Branch.

(e) Provide the factual basis for the Administration's legislative proposal if the President decided to authorize submission of the proposal to the Congress, and also provide the starting point for the many Congressional hearings that could be anticipated before passage of legislation authorizing a new production reactor.

(f) If Congress ultimately authorized the project and appropriated the necessary funds and if the project as authorized by Congress was not markedly different from the proposal, the Department's Environmental Impact Statement would also serve to enable a relatively prompt start of the actual construction of the project.

12. As required by section 212(b) of P.L. 97-90, on August 16, 1983, I notified the Armed Services Committees of the Senate and House of Representatives of the Department's intention to prepare an Environmental Impact Statement in accordance with the National Environmental Policy Act of 1969. The Senate Committee expressed no objections in response to the required notice. However, the Chairman of the Armed Services Committee of the House of Representatives, Melvin Price, expressed reservations that I interpreted as a concern that the concept of constructing a new production reactor was not yet adequately defined in terms of costs and alternatives for commencement of the EIS process to be considered timely.

13. After carefully considering this advice from the jurisdictional legislative committee of the House of Representatives, I determined that it would be appropriate to defer commencement of the EIS. I then directed the Department's

> [T]he new production reactor concept . . . has not been fully documented with respect to the projected needs for specific types of special nuclear material in future years, the type of reactor required, or the funding that would be necessary to build the reactor and associated facilities.

16. Upon my receipt of Chairman Price's June 18, 1934, letter, I determined that it would not be feasible to make a recommendation on any proposal for a new production reactor or its alternatives by mid-1985. After careful consideration, I decided that the Department should instead devote whatever additional time proves necessary to reassess potential options for assuring future availability of nuclear material. Accordingly, I decided also that the commencement of preparation of an Environmental Impact Statement should be deferred until these options are more refined and it again becomes time to decide if and when steps leading to preparation of a proposal should begin.

17. In order to carry out this reassessment the Department is continuing its analysis and compilation of data bearing on approaches for future supply of nuclear material. Though they may contribute to development of some type of proposal in the future, at present I do not know where these efforts will lead. These efforts may well lead me again to decide to start preparing a proposal for a new production reactor at a specific site using a specific technology, and they may result instead in my deciding

not to propose a new production reactor at all. Between these two possible approaches there exists a spectrum with many alternatives which we may choose to develop as proposals in the future to ensure our tritium production capabilities in the 1990s. In any event, submission of a report or recommendation on a proposal for a new production reactor or its alternatives during 1985 or by any other date is no longer part of the Department's plans for future nuclear materials supply.

I affirm under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Affirmed this 15th day of January, 1985.

Donald Paul Hodel
DONALD PAUL HODEL
Secretary of Energy

Enclosure #2

November 15, 1982

The Honorable Donald P. Hodel
Secretary
US Department of Energy
Forrestal Building, Room 7A257
Washington, DC 20585

Dear Secretary Hodel:

I have pleasure in enclosing, for your review, the final report of the New Production Reactor (NPR) Concept and Site Selection Advisory Panel (CSSAP) appointed by Deputy Secretary W. Kenneth Davis on July 21, 1982. The "charter" for the Panel, dated July 7, 1982, included a statement of "Objectives and Scope of Activities" which is quoted below.

> "To provide the Department of Energy (DOE) with recommendations on a concept and site selection for an NPR, based on proposed reactor concepts and sites to be furnished to the CSSAP. The major objective of the NPR is the production of tritium and other products to support the maintenance of the Nation's nuclear weapons stockpile. The Panel will prepare a report evaluating and ranking the candidate reactor concepts and sites."

The Panel met as a formal body on three occasions at the Los Alamos National Laboratory--July 27 through 30, August 10 through 12, and September 13 through 15. Additionally, the entire Panel met in Washington, DC on November 1 and 2 to review and complete the enclosed report. Informal meetings involving two to five members of the Panel met on four occasions to clarify or amplify certain members' understanding of particular issues. One such meeting took place at Lawrence Livermore National Laboratory on Monday, August 9, and involved five members of the Panel interested in the SIS process.

The enclosed final report was approved unanimously by the full Panel on November 2 at their meeting in Washington on that date. I think it is worth my recalling that this subject--the choice of a reactor concept and of a site on which it should be located--has been studied on several earlier occasions within the DOE and on at least one recent occasion by a group called together by Dr. Keyworth, the President's Science Advisor, earlier this year. It is suggested, respectfully, that further studies will do little to increase the validity of the recommendations our Panel has made.

We recognize, of course, the proprietary interests of many of the companies and Congressional people whose constituencies may be involved in each of the concepts or sites dealt with by our Panel. I can only say to you that it is my sincere belief that we have dealt with these matters thoughtfully, even-handedly, and in a determined effort to give you recommendations which, in our considered opinion, will best serve the security interests of the United States.

Although six reactor concepts were suggested for our review, we took the liberty of adding a seventh--really a simplification of one we were asked to address. The added "up-front" costs required to provide an energy production capability gave us concern. Providing such a capability would further stress current budget planning and could lower the probability of NPR program approval. The extent to which revenues from the sale of steam will offset such additional costs is a question sensitive to future power demands that would warrant building the generating unit by the USG or by private industry and, of course, to the pricing for electrical power some 15 or more years down the road.

It is a pleasure to commend heartily the services provided to and for the Panel by the good people at Los Alamos, the Albuquerque Operations Office, and members of Mr. Roser's staff. Most of the briefings we heard were provided by members of the Los Alamos National Laboratory staff who, individually and collectively, were very effective in their presentations and most patient in responding to the variety of questions posed by members of the Panel. In particular, I would like to commend James F. Jackson, leader of the Energy Division, who spared no efforts to make certain that the Panel was well served by his associates. Additionally, Dr. Jackson was extremely helpful in the preparation of the final report and the several earlier drafts of the document. Finally, I want to say that the members of the Panel made a team that would be hard to equal in their individual fields of special knowledge and in their willingness to debate the various questions which came up from each member as we worked our way to this final report. Special recognition should be made of the contributions of W. J. Howard who served most effectively as Vice Chairman.

It has been a privilege and a pleasure for each of us to be of service in this endeavor.

Sincerely,

T. Keith Glennan
Chairman, NPR/CSSAP

continuing analytical efforts to the examination of issues that would be responsive to Chairman Price's concerns and confirm to me that sufficient information had been developed to justify a decision to formulate a proposal for the construction of a new production reactor.

14. During the next eight months the Department acquired additional information and conducted additional analyses that I felt were relevant to the reservations that had been expressed by Chairman Price. Accordingly, I decided again to notify the Armed Services Committees of the Department's intention to begin preparation of an Environmental Impact Statement, and on May 17, 1984, I submitted the required notification to the Committees.

15. While the Chairman of the Senate Committee on Armed Services interposed no objection to commencement of preparation of the Environmental Impact Statement, Chairman Price again expressed reservations. Of critical concern to me was that, contrary to my prior understanding of the matter, his reservations were not confined to the timing of the preparation of an Environmental Impact Statement, but went to the very substance of the need for a new production reactor. In his advice to me of June 18, 1984, the Chairman stated:

REPORT OF THE NEW PRODUCTION REACTOR CONCEPT AND SITE SELECTION ADVISORY PANEL

NOVEMBER 15, 1982

EXECUTIVE SUMMARY

The New Production Reactor Concept and Site Selection Advisory Panel has evaluated the adequacy of future supplies of strategic nuclear materials (tritium and plutonium) and has reviewed seven candidate reactor concepts and four candidate sites for a New Production Reactor (NPR). This report provides the Panel's evaluation and ranking of concepts and sites called for in its charter. The key Panel recommendations are the following:

- An NPR should be constructed to assure an adequate supply of strategic nuclear materials in the 1990's and beyond.
- The NPR must be an efficient tritium producer, but should also be capable of producing plutonium and other reactor products.
- The Zero-Electric-Power Heavy-Water Reactor (ZEPHWR) located at the Savannah River Site is the Panel's recommended NPR concept providing the greatest assurance of meeting production goals.
- A second choice to the ZEPHWR, if the sale of by-product steam is required, is the Low-Temperature Heavy-Water Reactor (LTHWR) at Savannah River or the Replacement N-Reactor (RNR) sited at Hanford. The LTHWR provides better assurance of meeting production goals than the RNR. If tritium production at a site other than Savannah River were considered essential, or if greater emphasis were placed on the future revenue from the sale of by-product steam, the N-Reactor could become the clear second choice, or even the first choice, for the NPR. In fact, the Panel notes that the RNR at Hanford would provide the DOE with the combined program benefits obtained from retaining duality of reactor products production and the sale of by-product steam, together with acceptable assurance of meeting production requirements over the specified design life for NPR.
- The Panel concludes, that for reasons set forth in the body of the report, the other four concepts--Light-Water Reactor (LWR), High-Temperature Gas-Cooled Reactor (HTGR), Liquid-Metal Fast-Breeder Reactor (LMFBR), and Washington Nuclear Project Number 4 (WNP-4)--fail to meet adequately the criteria established by the Panel.

  The Panel also concludes that the Savannah River Site should be used for heavy-water reactors and the Hanford Site for all other concepts

In making the concept and site ranking and evaluations, the Panel has considered numerous criteria. The most important of these were assurance of meeting the production goal for the operation of an NPR. Other important criteria for evaluation of reactor concepts were (1) costs, (2) safety and environmental impacts, (3) sale of by-product steam, (4) use of up-to-date technology, and (5) nonproliferation and public acceptance concerns. In evaluating candidate sites, the Panel was most concerned with (1) providing assured availability of reactor products, (2) ensuring that the site has adequate manpower and facility support for an NPR, and (3) ensuring that the site is suitable in terms of safety, environment, public acceptance, and cost.

STRATEGIC NUCLEAR MATERIALS SUPPLY AND DEMAND

Early in its deliberations, the Panel was given classified information relating to the present status of the Nation's supply of strategic nuclear materials and an estimate of the long-range demand for and supply of such materials. Members of the Panel came to the conclusion that the need for the study they had been asked to undertake was a valid one.

SITE SELECTION

SUMMARY AND CONCLUSIONS

The Panel examined the following four candidate sites specified by DOE for consideration:

--the Savannah River Site (SR) in South Carolina,
--the Hanford Site in Washington,
--the Idaho National Engineering Laboratory (INEL) in Idaho, and
--the Nevada Test Site (NTS) in Nevada.

The selection of the candidate sites was based on the requirement that the NPR be built on a Federal government reservation.

The Panel identified a number of problems with NTS as an NPR site and eliminated NTS from consideration prior to ranking the candidate sites. The principal problems that were identified for NTS were (1) probable conflicts with the US underground nuclear weapons test program, (2) safety questions concerning weapons-test-induced seismicity, (3) the lack of an assured supply of sufficient good-quality water for cooling, and (4) the lack of sufficient support infrastructure to construct and operate a large weapon-materials production reactor along with required fuel-cycle and target-processing facilities.

The remaining three candidate sites were ranked with regard to each of 11 criteria thought to be important for determining the suitability of each for construction of an NPR (see Table I). Except for concerns about concentration of production facilities on one site in the case of Savannah River, both the Hanford and Savannah River sites were found to be satisfactory for the purpose intended. For the LTHWR sited at Savannah River, some salable by-product steam would be produced although the revenue potential, if any, is small. The INEL site was found to be less suitable than Hanford and Savannah River primarily because it lacks experience with many of the facilities and technologies required for a strategic nuclear materials production site.

CRITERIA AND RANKING

The three principal candidate sites, Savannah River, Hanford, and INEL, are ranked with regard to suitability for each of 11 main criteria in Table I. No relative weighting of the importance of these criteria is implied by the order of their listing. The main concerns leading to the relative rankings for each criterion are listed and discussed briefly in the following text.

Two principal assumptions have been made for the purpose of making the rankings. The first is that if the NPR is constructed at any site except Savannah River, a tritium recovery and processing facility will be required to be constructed at that site. Second, the existing facilities at the site chosen for the NPR will be used to support its fuel cycle, with upgrades, additions, and modifications to be made as required.

TABLE I

SITE SELECTION CRITERIA

(1) Water Supply
(2) Support Facilities
(3) On-Site Professional Support and Infrastructure
(4) Construction Labor Availability
(5) By-Product Steam Sales
(6) Waste Disposal
(7) Environment
(8) Transportation
(9) Costs
(10) Public Acceptance
(11) Duality of Sites

4. Construction Labor Availability

- A large work force is available very near Hanford or Savannah River.
- Labor stability has been excellent at both Savannah River and INEL. Hanford has experienced construction labor disruption in the past, but indications are that this situation is now satisfactory.
- At INEL, the crafts requirements for an NPR exceed the availability within 50 miles and are a significant fraction of availability within 200 miles for a number of crafts.

Hanford and Savannah River are ranked essentially equal in terms of construction labor availability. INEL is ranked lower because of possible shortages in construction labor with resulting construction delays.

5. By-Product Steam Sales

- By-product steam sales can significantly reduce the unit costs for strategic nuclear materials production, and we assume there will be an adequate market for this steam beginning in the 1990's.
- INEL or Savannah River would need additional high-voltage transmission capability for distribution of NPR power.
- Hanford has a current system of substations and transmission lines as well as a current infrastructure to support the sale of significant quantities of by-product steam from an NPR. The Bonneville Power Administration provides a regional distribution network for wheeling of power from an NPR at Hanford. The precedent for by-product steam sales is established at Hanford.
- The utilities near INEL have volunteered an interest in utilizing the by-product steam for the generation of electricity.

Hanford is ranked the highest of the three sites for sales of by-product steam. INEL and Savannah River are ranked somewhat lower because the additional transmission capability required for electricity distribution makes the purchase of such energy less attractive.

1. Water Supply

- All sites have an adequate supply of high-quality water.
- There are potential concerns about contamination of the aquifer at INEL by reinjection of cooling-tower blowdown.

Hanford and Savannah River are ranked essentially equal with regard to water supply. INEL is ranked slightly lower because of potential concerns about contamination of the aquifer.

2. Support Facilities

- Savannah River has sufficient heavy water for a new production reactor and has complete support facilities for a heavy-water reactor fuel cycle.
- Hanford has complete support facilities (except for tritium recovery) for the current N-Reactor fuel cycle.
- INEL has highly enriched fuel-processing and waste-calcination facilities but does not have support facilities for NPR in the plutonium-production mode. Unless the planned expansion of their reprocessing facilities is funded, there will be competition between the naval reactor program and NPR with regard to fuel reprocessing.

Hanford and Savannah River are rated essentially as equal with regard to available support facilities, and with reasonable additions each site could support all reactor concepts. However, Savannah River is more suitable for the heavy-water concepts, whereas Hanford is more suitable for the RNR concept. Hanford and INEL both lack a tritium recovery and processing facility. INEL is ranked significantly lower for all concepts due to a lack of fuel fabrication, plutonium reprocessing, and other production support facilities.

3. On-Site Professional Support and Infrastructure

- Savannah River and Hanford currently support large-scale programs for the production of strategic nuclear materials.
- INEL has no history of special nuclear materials production.

Savannah River has a full complement of on-site professional support capability and is backed up by a single integrated designer, constructor, and operator. Hanford would need to supplement the existing professional complement at the site. INEL is ranked significantly lower on this criterion because they would need a substantial addition to the professional staff.

6. Waste Disposal

- Each of the three sites has ongoing programs in waste management and disposal to support an NPR.
- Available on-site support waste-processing facilities will be useful in meeting an early 1990's target operation date for an NPR, but additional facilities will be required.

Construction funding for a waste-solidification facility at Savannah River is expected. There are no plans for a geologic-disposal facility at Savannah River or INEL. DOE has an active program to develop geologic waste disposal in basalt at Hanford. INEL has a facility to convert waste into a calcined product. Funding would be required for a facility to convert this into glass for ultimate disposal.

7. Environment

- Each of the three sites is generally suitable for an NPR from the standpoint of environmental effects.
- The NPR is expected to have low rates of radioactive emissions.

All three sites are ranked essentially equal with regard to environmental criteria.

8. Transportation

- INEL lacks barge access.
- Hanford may avoid off-site shipment of radioactive waste from reprocessing through the possible future establishment of a basalt waste repository.

Hanford and Savannah River are ranked as essentially equal with regard to this criterion. However, if complete waste solidification and a geologic repository are funded at Hanford, it would avoid off-site transportation of radioactive waste, and Hanford would be ranked slightly higher. The lack of barge access to INEL for construction results in a lower ranking for INEL.

9. Costs

- Construction labor rates are lower at Savannah River.
- Hanford and INEL would require a tritium recovery and processing facility for an NPR.
- Hanford may avoid off-site shipment of radioactive wastes.

- o Most fuel-cycle facilities for support of an NPR are in place at Savannah River and Hanford (especially for a heavy-water reactor at Savannah River and an RNR at Hanford). New fuel-cycle facilities would be required at INEL.
- o Poorer construction labor availability and barge access at INEL may increase costs relative to the other two sites.

- Savannah River has lower construction costs.

10. Public Acceptance

- o Each of the three sites enjoys a high degree of local public acceptance.
- o Hanford and Savannah River have ongoing production missions that are well accepted, whereas INEL lacks a similar production history.

All three sites are rated as being essentially equivalent in terms of public acceptance of an NPR.

11. Duality of Sites (The Desirability of Having More Than One Site in Operation to Produce Strategic Nuclear Materials)

- o All of the current tritium production and most of the current plutonium production takes place at Savannah River.
- o N-Reactor at Hanford will cease operation in the early to mid-1990's, at which time all the Nation's strategic nuclear materials would be produced at Savannah River.
- o It is important that the US production of strategic nuclear materials not be disrupted by any local site-dependent factor or occurrence.

Hanford and INEL are ranked as most suitable for providing duality of sites in the production complex. Depending on the concept selected, the revenue from sale of by-product steam from the types of reactor that would be built at these sites could exceed the added costs of duality.

SITE CONCLUSIONS

The Panel's conclusions on NPR sites are as follows.

(1) Either the Savannah River Site or the Hanford Site is considered suitable for an NPR.

(2) The Savannah River Site is recommended if a heavy-water reactor is to be built, whereas the Hanford Site is recommended for any of the others.

(3) The Idaho Site was judged to be less suitable because of not having a history of materials production and such additional factors as lack of barge access and concerns over local labor availability and on-site professional support.

(4) The question of site duality was considered by the Panel. Although site duality does offer advantages, the Panel is not aware of any DOE plans to provide this duality in other areas of the weapons-production complex. We do recognize that their very long lead times make the reactor and support facilities a pacing item if such a policy is adopted.

CONCEPT SELECTION

SUMMARY AND CONCLUSIONS

The Panel considered seven candidate reactor concepts for construction of an NPR.

--Low-Temperature Heavy-Water Reactor (LTHWR)
--Replacement N-Reactor (RNR)
--Light-Water Reactor (LWR)
--Liquid-Metal Fast-Breeder Reactor (LMFBR)
--High-Temperature Gas-Cooled Reactor (HTGR)
--Washington Nuclear Project Number 4 (WNP-4)
--Zero-Electric-Power Heavy-Water Reactor (ZEPHWR)

The first six candidates were specified by DOE after an extensive DOE-sponsored screening and evaluation process. The seventh was added to the list by the Panel because it believes the extensive successful experience with Savannah River reactors and the demonstrated capability of the site contractor (duPont) make the ZEPHWR reactor the highest confidence option for satisfying the overriding objective of producing needed strategic materials on a timely basis.

After evaluation of the concepts with regard to a number of important criteria, the Panel recommends the Zero-Electric-Power Heavy-Water Reactor (ZEPHWR) sited at Savannah River as providing the greatest assurance of meeting production goals. A second choice to the ZEPHWR, if the sale of by-product steam is required, is the Low-Temperature Heavy-Water Reactor (LTHWR) at Savannah River or the Replacement N-Reactor (RNR) sited at Hanford. If the sale of by-product steam is required, the LTHWR provides better assurance of meeting production goals than the RNR. If tritium production at a site other than Savannah River were considered essential, or if greater emphasis were placed on the future revenue from the sale of by-product steam, the N-Reactor could become the clear second choice, or even the first choice, for the NPR.

The remaining four concepts (LWR, HTGR, LMFBR, and WNP-4) are downrated for two reasons. The Panel considers that the lack of demonstrated tritium retention and recovery capability of proposed target assemblies makes these concepts' qualifications questionable. Furthermore, these four concepts could raise considerable worldwide concern that the US was developing technology to convert commercial reactors to weapon-materials production. The LWR is ranked fourth because of uncertainties such as fuel and target performance. The HTGR is ranked fifth because the reactor concept has not been fully demonstrated, especially in the size being contemplated, and the technology for reprocessing irradiated fuel and targets is less fully developed. The remaining two concepts, the LMFBR and WNP-4, are found to be unsuitable for a variety of reasons including concerns about product assurance and successfully meeting an early 1990's startup schedule.

CONCEPTS: DESCRIPTIONS, ADVANTAGES, AND DISADVANTAGES

A listing of some of the more pertinent advantages and disadvantages of each of the concepts as perceived by the Panel follows.

1. Zero-Electric-Power Heavy-Water Reactor (ZEPHWR) Sited at Savannah River

The ZEPHWR is a higher-power version of the existing heavy-water-cooled and moderated Savannah River Plant (SRP) production reactors.

Advantages

- Demonstrated constructability, operability, and reliability of heavy-water reactors and supporting systems for producing tritium and plutonium.
- Production-scale operations for fuel and target fabrication, fuel reprocessing, and tritium and plutonium separation in place and operational.
- Low temperature and pressure operation.
- Simplicity of design and operation (not complicated by commitments to produce and sell by-product steam).
- Complete life-cycle experience.
- Production-scale waste solidification is planned, and funding is expected.
- duPont is a single integrated designer, constructor, and operator with an outstanding record of competence, experience, depth, and reliability.

Disadvantages

- Scale-up on size of reactor and number of target assemblies required. This design effort is in the conceptual stage.
- New design of emergency-core-cooling system, tritium removal, and containment required.
- Highest annual operating costs of the concepts. (No sale of by-product steam to offset production costs.)
- Has not undergone updated safety review based on strict compliance with current safety standards.

- Concentration of production facilities at a single site.
- Interactions with existing operating reactors have not been fully investigated.

2. Low-Temperature Heavy-Water Reactor (LTHWR) Sited at Savannah River

The LTHWR is a vertical-pressure-tube reactor, cooled and moderated by heavy water. It is similar in concept to the existing Savannah River Plant (SRP) production reactors, except that pressure tubes will be added to allow for the higher temperatures required for power generation.

As in the other by-product steam-producing concepts, the Panel assumes that either an investor- or government-owned electric power producer would be willing to purchase the by-product steam from the NPR at a price approaching its avoided costs and to provide the turbine-generator and interconnection facilities. The smaller amount of by-product steam available from LTHWR limits the potential revenue from steam sales for this concept.

Advantages

- A small extrapolation from present Savannah River reactors with demonstrated constructability, operability, and reliability of reactor and supporting systems for producing tritium and plutonium.
- Production-scale operations for fuel and target fabrication, fuel reprocessing, and tritium and plutonium separation in place and operational.
- Low temperature and pressure operation.
- Production-scale waste solidification planned, and funding is expected.
- duPont is a single integrated designer, constructor, and operator with an outstanding record of competence, experience, depth, and reliability.

Disadvantages

- Scale-up on size of reactor and number of target assemblies required. Design in conceptual stage.
- As in subsequent concepts, design complicated by commitment to produce and sell by-product steam. (Addition of pressure-tube technology for the LTHWR.)
- New design of emergency-core-cooling system, tritium removal, and containment required.
- Lowest ranking of the power producers in life-cycle cost benefits.
- Has not undergone updated safety review based on strict compliance with current safety standards.
- Concentration of production facilities at a single site.
- Interaction with existing operating reactors has not been fully investigated.

3. Replacement N-Reactor (RNR) Sited at Hanford

The RNR is a graphite-moderated water-cooled pressure-tube reactor that builds upon the experience of the existing N-Reactor.

Advantages

- Small extrapolation from N-Reactor technology with some upgrading for graphite stability, refueling, and steam generators.
- Demonstrated base of reliability, constructability, and operability for plutonium production.
- Demonstrated coproduction of tritium and plutonium.
- A second-generation production reactor, since there is no scale-up in power level.
- Production-scale operation for fuel fabrication in place. Proven fuel components for plutonium production.
- Existing Purex fuel reprocessing for plutonium production is being reactivated.

- Existing operating contractor with excellent record and complete life-cycle experience with the N-Reactor and its fuel cycle.
- On-site capability in reactor design, reprocessing technology, and waste management.
- Possible future on-site geologic waste repository in basalt.
- Revenue from sale of by-product steam could more than offset the difference in costs compared with heavy-water reactor options.

Disadvantages

- Redesign of enriched fuel and tritium targets required. Slightly higher temperature than in the present N-Reactor may affect tritium containment.
- New design of refueling, steam generators, graphite, and containment required.
- Additional waste volume from redesigned fuel.
- New facilities for processing tritium targets required.
- New facilities for dissolving new fuel are required.
- Has not undergone updated safety review based on strict compliance with current safety standards.
- Because of the present infrastructure of many different organizations, requires an integrating contractor assignment for NPR similar to the duPont role for heavy-water reactors.

4. Light-Water Reactor (LWR)

The LWR is based on current commercial pressurized-light-water-reactor (PWR) technology, specifically the Westinghouse four-loop PWR. With the exception of core and targets, the LWR incorporates components and systems in the reactor and balance of plant identical to those in currently operating PWRs.

Advantages

- Design based on Westinghouse advanced pressurized-water-reactor technology except for fuel and targets. It represents a mature industry option which has design, construction, and operating expertise available. The basic LWR concept has undergone numerous safety reviews, but the redesign will need new safety reviews.
- Because design is based on current PWR technology, confidence can be placed in cost and schedule estimates. Except for the core and targets, designs are well advanced.
- Revenue from sale of by-product steam could more than offset the difference in costs compared with heavy-water reactor options.
- The LWR has been a reliable and economic producer of steam for electricity.

Disadvantages

- Potential worldwide concern over use of commercial nuclear technology to produce weapons material.
- Prompt negative temperature coefficient of reactivity of low-enrichment PWRs is greatly reduced.
- Proposed fuel will require some fabrication R&D.
- Startup date contingent on sequential steps of competitive bidding for a reactor design and selection of an integrating contractor.
- Insufficient evidence of tritium retention in target.
- If current target design is used, its low melting temperature increases probability of target redistribution in core-melt accident in this reactor type. If higher temperature target is used, performance of the escape barrier must still be demonstrated.
- New facilities required at Hanford for dissolving fuels.

- Risk of production being disrupted by response to public pressure to address issues raised in connection with commercial LWRs.
- Has not undergone a safety review with the core and targets required for tritium production.

5. High-Temperature Gas-Cooled Reactor (HTGR)

The HTGR is a helium-cooled graphite-moderated reactor that is based directly on designs proposed for commercial HTGR power plants.

Advantages

- Revenue from sale of by-product steam could more than offset the difference in costs compared with heavy-water reactor options.
- Driver fuel developed and demonstrated.
- Production-scale operation for fuel fabrication.
- General Atomic has made good progress in overcoming problem of tritium retention in high-temperature targets.
- Rapid heat transfer to core graphite provides slow core heating during transients.
- If located at Hanford, would benefit from partial use of Purex facility and from possible high-level waste geologic repository.
- If located at Idaho, would benefit from Idaho experience to be gained in reprocessing Rover graphite fuel and would benefit from partial use of reprocessing facility.
- NRC has approved highly enriched operation at Fort St. Vrain, but the redesign will require a complete safety review.

Disadvantages

- The NPR would be a significant scale-up and redesign from existing HTGR experience.
- There is not sufficient US construction and operating experience to provide a satisfactory basis for assuring constructability, operability, and reliability of production.
- Experience at Fort St. Vrain does not provide assurance that such a reactor can be built and operated reliably to meet production goals.

- Technology for fuel and target reprocessing has not been fully developed.
- Large volume of radioactive waste whether or not spent fuel is reprocessed for uranium recovery.
- New facilities for fuel and target reprocessing would be required.
- High front-end costs.
- Has not undergone safety review with targets for tritium production.

6. Liquid-Metal Fast-Breeder Reactor (LMFBR)

The LMFBR is a liquid-sodium-cooled pool-type reactor in which the entire primary system is contained in the reactor vessel.

Advantages

- High neutronic and thermal efficiency.
- Advances LMFBR technology for which there is a national commitment.
- Revenue from sale of by-product steam could more than offset the difference in costs compared with heavy-water reactor options.
- A large volume of subcooled sodium can provide substantial protection against evaporation of core coolant in an accident.
- Large laboratory and industrial infrastructure available to support development. Concept utilized in US at EBR II and FFTF.

Disadvantages

- Target technology not proven.
- Capital costs highest of all reactor concepts.
- Sodium-coolant technology less well demonstrated than water.
- Poor utilization of fast-neutron spectrum.

- Significant scale-up and redesign from existing LMFBR experience.
- Very unlikely to meet production goals by early 1990's.
- Major extrapolation of existing US LMFBR technology.
- Has not undergone safety review with new fuel and targets.

7. Washington Nuclear Project Number 4 (WNP-4)

WNP-4 is a Babcock and Wilcox pressurized-water-reactor (PWR) power plant located on the DOE Hanford Reservation. Although 24% complete with essentially all of the nuclear steam supply system designed and procured, the plant has been terminated by the Washington Public Power Supply System (WPPSS). Large components such as the reactor vessel, vessel head, core barrel, and steam generators are on site. The balance of the plant is virtually completely engineered, and construction is well under way on major structures such as the containment building, general-services building, turbine-generator building, and cooling towers. NRC licensing is continuing based on the twin WNP-1 unit. A total of $804 million has been spent to date.

Advantages

- Design based on established commercial (Babcock and Wilcox) pressurized-water-reactor technology except for fuel, targets, and any special safety systems that might be required.
- Partially completed plant (about 25% of construction and 88% of procurement).
- Revenue from sale of by-product steam could more than offset the difference in costs compared with heavy-water reactor options.
- Potential schedule and cost advantages.
- Located at one of the desirable production sites.

Disadvantages

- Less-than-goal production capability.
- Public concern stemming from use of a commercial plant for weapon-materials production.
- Uncertainty in legal and contractual issues could delay construction.
- Specialized production-type fuel would require a reengineered safety system.
- Storage of components already on site introduces concerns regarding quality control.
- Prompt negative temperature coefficient of reactivity of low-enrichment PWRs is greatly reduced.
- High waste volume from fuel.
- Production may be interfered with because of public pressure to address issues raised in connection with commercial LWRs.
- Has not undergone a safety review with the new core and targets required for tritium production.

CONCEPT EVALUATION CRITERIA

TABLE II

CRITERIA FOR REACTOR-CONCEPT EVALUATION

- Product Assurance Once Operational

  --Status of target technology
  --System operability, reliability, and maintainability
  --System flexibility
  --Level of production
  --Amount of technological extrapolation

- Confidence in Meeting Early 1990's Startup Date

  --Current design status
  --Recent design, engineering, and construction experience
  --Infrastructure to support design and construction
  --Development status of major components
  --Full-scale operation/demonstration
  --Research and development requirements

- Initial Up-Front Costs

  --Capital costs
  --R&D costs

- Levelized Product Costs

  --Confidence in capital and operating costs
  --By-product steam sales
  --Level of production

- Safety and Environmental Considerations

  --Radiation exposures
  --Effluent discharges
  --Reactor safety

- Strategic/Institutional Issues

  --Duality of reactor concepts and sites
  --By-product steam production
  --Up-to-date technology
  --Advancement of nuclear technology
  --Nonproliferation issues
  --Public acceptance

The criteria used in evaluating the candidate-reactor concepts for an NPR are listed in the foregoing Table II and described briefly in this subsection. The criteria of product assurance and operation in the early 1990's are of principal importance. However, strategic and institutional issues are also given significant weight in making the concept recommendations.

1. Product Assurance Once Operational

Once the NPR is operational, it is essential that it produce goal quantities of tritium reliably to supply the US defense needs. The absolute level of reliable production for each concept is therefore of primary importance. A high level of production helps assure that tritium demand will be met in spite of unanticipated shutdowns or operational difficulties. Assurance or demonstration of operability, reliability, and maintainability provides additional confidence that production goals will be met.

For tritium production, it is important that a suitable lithium target be available in the near future, a target that produces sufficient tritium, retains the tritium while in the reactor, and allows the tritium to be totally recovered in processing. While tritium production is the primary mission for an NPR, it is important that an NPR also be flexible by being capable of plutonium production or coproduction if necessary.

2. Confidence in Meeting Early 1990's Startup Date

The Panel feels that it is important that an NPR be operational by the early 1990's. The confidence that this schedule can be met is strongly affected by a number of factors. These factors are generally related to applicable past and recent experience, program R&D needs, and the current design status of the candidate-reactor concepts.

Recent design, engineering, and construction experience with a reactor concept may lead to a more rapid construction schedule, as may the availability of a large organizational infrastructure to support construction of the concept reactor. Prior full-scale operation of a concept reactor for an extended period provides added confidence that significant problem areas will have been identified prior to construction. The status of the reactor design and the status of component development each affect the confidence in any projected construction schedule.

In addition to confidence in meeting the early 1990's start-up date, the above factors also affect other criteria. For example, cost contingencies must be increased for those concepts that are in only very preliminary design stages. Concepts lacking recent design, engineering, and construction experience may not conform to current standards nor incorporate the most recent technology.

3. Up-Front Costs

The up-front costs for an NPR are the reactor capital costs and the incremental R&D costs needed to construct a concept reactor. The base program R&D cost has not been considered in this evaluation of candidate-reactor concepts. In general, the capital costs are much higher than the required incremental R&D costs.

Reactor concepts having particularly low capital costs have less budgetary impact, a positive attribute for achieving public and Congressional acceptance. Very high capital-cost concepts may prove to be unacceptable, particularly if the NPR program becomes controversial.

4. Levelized Product Costs

The levelized cost reflects all costs net of revenues over the life of the reactor and adjusted for the time-value of money. A major contributor to the levelized tritium costs are the capital costs, which are considered explicitly as a separate criterion due to their immediate impact on the government budget process. A contributor to estimated capital costs are contingencies arising from the uncertainties due to extrapolation of designs from existing experience and concerns related to construction difficulties.

In evaluating the NPR reactor concepts, the absolute level of production is important in that low production levels tend to result in higher relative levelized costs (although this effect can be reduced by lower capital costs). A major factor in the NPR levelized product costs for by-product steam-producing NPR concepts is the revenue stream arising from sale of by-product steam. Revenue from sale of by-product steam could more than offset the difference in costs compared with heavy-water reactor options.

5. Safety and Environmental Considerations

It is important that an NPR operate in a safe and environmentally responsible manner. The NPR must meet safety and environmental standards comparable to those for commercial nuclear reactors. Radiation exposures and effluent discharges are to be kept as low as reasonably achievable. Concepts having inherent safety features or proven redundant engineered safety features have advantages under this criterion over those lacking such features.

6. Strategic and Institutional Issues

These issues comprise many different concerns that may or may not be interdependent. Many of them reflect on the acceptability of an NPR concept. The five principal strategic and institutional issues are described below.

a. Duality of Production Concept. Because a generic problem can develop with any reactor technology, some diversity of reactor design could be an advantage in the production complex. Without duality of concept, a major generic or regional problem could threaten to shut down the entire production complex.

b. By-Product Steam Production. Use of by-product energy that would otherwise be dumped will contribute to national energy resources, minimize thermal discharges, and provide revenue to offset costs. The ability to sell by-product steam for electric power generation may also allow retention of production capability during periods of reduced tritium or plutonium demand. (This was the case with the N-Reactor.)

c. Up-to-Date Technology. In building an NPR, it seems appropriate to take advantage of the technology development that has occurred over the past few decades, much of it at taxpayers' expense. In addition, since an NPR will be used well into the next century, the risk of technical obsolescence should be minimized.

d. Advancement of Nuclear Technology. Depending on the concept selected, the development and construction of an NPR may make useful contributions to the advancement of nuclear technology and nuclear safety.

e. Nonproliferation Issues. A proposal to use commercial nuclear technologies to produce weapon materials may raise grave concerns about nonproliferation.

CONCEPT CONCLUSIONS

The Panel's conclusions on NPR concepts are summarized below:

- The Zero-Electric-Power Heavy-Water Reactor (ZEPHWR) located at the Savannah River Site is the Panel's recommended NPR concept providing the greatest assurance of meeting production goals.
- A second choice to the ZEPHWR, if sale of by-product steam is required, is the Low-Temperature Heavy-Water Reactor (LTHWR) at Savannah River or the Replacement N-Reactor (RNR) at Hanford. The LTHWR provides better assurance of meeting production goals than the RNR. If tritium production at a site other than Savannah River were considered essential, or if greater emphasis were placed on the future income from the sale of by-product steam, the N-Reactor would become the clear second choice, or even the first choice, for the NPR. In fact, the Panel notes that the RNR at Hanford would provide the DOE the combined program benefits obtained from retaining duality of reactor products production and the sale of by-product steam, together with acceptable assurance of meeting production requirements over the specified design life for NPR. •

- The LWR is ranked fourth. The LWR and the following three concepts all suffer from proliferation and tritium-target concerns.

- The HTGR is ranked fifth because the reactor concept has not been fully demonstrated, especially in the size being contemplated, and the technology for reprocessing irradiated fuel and targets is less fully developed.

- The LMFBR is ranked sixth, in part because its development is less advanced than the other concepts.

- The WNP-4 reactor is ranked last, primarily because of retrofitting problems and the potential for adverse public perception of converting a plant designed for commercial production of electricity to production of weapons material.

The ZEPHWR sited at Savannah River and designed, constructed, and operated under duPont supervision and management is the concept most likely to provide the required amount of tritium by the early 1990's. The design of this system represents the least departure from proven technology, and the availability of a contractor of such proven competence and experience as duPont provides the greatest assurance that production goals will be met at predictable costs.

If production of electricity along with tritium is essential, the Low-Temperature Heavy-Water Reactor (LTHWR) sited at Savannah River and designed, constructed, and operated under duPont supervision and management is the concept regarded as most likely to meet production goals by the early 1990's primarily because of the availability of duPont as the integrating contractor for NPR.

If production of tritium at a site other than Savannah River or an amount of by-product steam greater than available from a LTHWR is considered essential, the Replacement N-Reactor (RNR) sited at Hanford is the concept considered most likely to meet production goals by the early 1990's. If greater emphasis than the Panel's were placed on the future income from the sale of by-product steam, or if tritium production at a site other than Savannah River is deemed essential, the RNR could become a clear second choice, or even first choice for the NPR. The reactor design is a substantial improvement over the present N-Reactor, and like the heavy-water reactors, is a minimal departure from proven technology. The fuel and target designs are different but have been demonstrated by operation on a respectable scale. Contractors are available at Hanford with experience in running this type of reactor and carrying out the fuel-cycle operations it requires.

An LWR used as a tritium producer would require some development of cermet fuels and considerable target exploration to choose a proven target. Use of LWR technology for US weapon production could be interpreted as leading the way to weapon-material application of power reactors around the world--a proliferation consideration of major implications. There is also a risk of production being disrupted by response to public pressure to address issues raised in connection with commercial LWRs.

Any HTGR installation would require considerable scale-up to reach NPR production quantities, and US experience at Fort St. Vrain fails to provide assurance that the US can build and operate an HTGR-NPR reliably enough to meet production goals. High front-end costs, considerable remaining technology development, and schedule concerns for an NPR lead to this ranking for the HTGR as a production reactor.

Neither the LMFBR nor WNP-4 provide confidence that tritium production requirements could be met by the early 1990's. The LMFBR's high capital costs, substantial target uncertainties, and large required plutonium inventory results in its low position in the ranking. The inability to meet goal-production quantities and the potential for numerous institutional problems leads to a recommendation against the WNP-4 concept.

The Panel considered the advantages that could accrue from selling by-product steam to an electrical power system. These advantages could include protection against inflation, the offsetting of operating costs, and justification for continuing facility operation during periods of low materials demand. The Panel recognizes that the magnitude of power-generating revenues is uncertain and will be influenced by demand and kWh-pricing variations and production reactor operation.

The likelihood of a reactor-products-demand slump seems remote. In the 1960's the N-Reactor, but for its role as a power generator might have been closed. Power generation can have negative aspects beyond the higher up-front costs. These include possible licensing exposures, added interface and infrastructure requirements, and recognition of the US sentiment to separate weapon-materials production from commercial power.

In general, the Panel felt that the available cost and schedule predictions are also uncertain, especially with respect to absolute and even to relative costs. This led the Panel to apply its own judgment in the area of expected costs.

Members of the Panel would like to call to the attention of those responsible for these matters the fact that, if one NPR is on stream in the early '90s, the DOE will have provided, in fact, only for the replacement of a portion of the production capacity of the existing Savannah River production reactors, all of which will then be approaching 40 years in service. Since the principal product expected to be produced in the NPR is a relatively short-lived material, it appears to us that the exercise we have just completed should be repeated at intervals to insure a continuing availability of modern production facilities so long as these materials are forecast to be needed. A continuing moderate level of effort in R&D will be justified to insure that production reactors authorized for construction in later years will continue to be as up-to-date as then current design and new technology will permit.

(The report in its classified form was signed by the Committee on November 15, 1982. The panel consisted of the following members:

Frank Baranowski
Wallace B. Behnke
Manson Benedict
Robert E. Hollingsworth
Thomas H. Pigford
William J. Howard, Vice Chairman
T. Keith Glennan, Chairman)

OFFICE OF THE PRESS SECRETARY
WASHINGTON DC 20585

DOE NEWS:

ENCLOSURE #3

NEWS MEDIA CONTACT:
Gail Bradshaw, 202/252-5806

FOR IMMEDIATE RELEASE
AUGUST 11, 1983

ENERGY SECRETARY ORDERS EIS PREPARED ON NEW PRODUCTION REACTOR AT IDAHO

Secretary of Energy Don Hodel announced today that he has directed that an Environmental Impact Statement (EIS) be prepared on the suitability of constructing a heavy water production reactor (HWR) at the department's Idaho National Engineering Laboratory near Idaho Falls.

The new production reactor would produce nuclear materials, tritium and/or plutonium for the nation's nuclear weapons programs. Currently, those materials are being produced primarily at the department's Savannah River Plant in South Carolina.

"The new reactor in Idaho will diversify our production capacity and assure that the nation has an adequate and reliable supply of these critical materials," the Secretary said.

In announcing his order, the Secretary cited a report from an advisory panel headed by T. Keith Glennan, former Commissioner of the Atomic Energy Commission and first Administrator of the National Aeronautics and Space Administration.

"The Glennan report indicates that a modern version of the heavy water reactor, with which we have 30 years of experience, is the most technically reliable means of getting new production capacity on line in the shortest time" Secretary Hodel added.

Additional alternatives to be examined in the EIS will include: a pressurized water reactor at the department's Hanford Site near Richland, Washington; a high temperature gas cooled reactor (HTGR) at Idaho; or an HTGR at Hanford.

In addition to the technical assessment and the analyses provided in the Glennan report, the Secretary also consulted DOE staff, local representatives familiar with the Idaho and Hanford sites and with members of Congress.

Following completion of the EIS, the Secretary will make a recommendation to the President regarding the construction of the New Production Reactor and its inclusion in the President's budget for the Department.

Public participation will be encouraged in this process. The department will publish shortly in the Federal Register a notice of its intent to prepare an EIS and announcing the time and place of public meeting to discuss the issues which should be addressed in the EIS.

SOUTH CAROLINA Section C The Charlotte Observer Sunday, November 13, 1983

Local And Regional News • Story or Picture Idea? Call (704 379-6459 8 a.m.-Midnight

Political Realities Shape S.C.'s Pursuit Of Nuclear Reactor

Hodel

By JIM WALSER
Columbia Bureau

COLUMBIA — The prize is a $6 billion nuclear weapons production reactor, a massive state-of-the-art facility that would take 4,000 construction workers years to build and would provide 2,000 jobs when they finish.

As construction projects go, it's a recersion-buster.

Building the reactor could keep an area — say, the 13 counties surrounding the 190,000-acre federal Savannah River Plant near Aiken, S.C. — out of the economic doldrums for years.

Until recently, there was little doubt the U.S. Energy Department's prize would have been won by South Carolina.

Since the early 1950s, under contract with the Energy Department, 10,000 Du Pont Co. employees have manufactured all the nation's tritium and plutonium for nuclear weapons in five aging reactors at the Savannah River Plant, 60 miles southwest of Columbia. The sprawling plant's 1983 budget approaches $1 billion.

But instead of being routine, the decision over where to build the new reactor in the 1990s has become a classic political and bureaucratic sideshow.

It pits South Carolina against two Western states, Republicans against Democrats — and sometimes against other Republicans — and local businesses against Columbia-based environmentalists.

For months, U.S. Energy Secretary Donald Hodel has dangled the proposed new reactor like a yo-yo in front of three states: South Carolina, Washington and Idaho.

But on Sept. 30, Hodel seemed to eliminate South Carolina. Citing "considerable hostility" over the past year from S.C. officials and environmentalists over plans to restart a separate, mothballed nuclear reactor at the Savannah River Plant, Hodel said the department would take its new, $6 billion reactor elsewhere.

"Washington and Idaho are eager for us to come in there," said Hodel.

Hodel's comments were clearly aimed at S.C. Gov. Dick Riley and S.C. Attorney General Travis Medlock, two Democrats who decided last spring the state should join a suit by environmentalists designed to force the Energy Department to perform a lengthy, $1 million environmental impact study before restarting the old nuclear reactor, called the L-reactor.

The suit was a historic gesture by state government, which never before had challenged federal authority on environmental questions at the plant.

Eventually, a federal judge sided with the environmentalists. The L-reactor originally was

See PURSUIT Next Page

tinued From Preceding Page

Riley

Medlock

duled to be restarted last h but that has been delayed an official environmental im- statement is finished.

del's decision to eliminate h Carolina from competition he new reactor infuriated Ri- Sen. Strom Thurmond, R- nd Aiken civic leaders some of whom blamed Riley and the environmentalists.

"Part of the blame must go to the hostility of certain public officials in South Carolina," said an editorial in the Aiken Standard, citing Riley, Medlock and Rep. Butler Derrick, D-S.C. "Loss of the (reactor) will be celebrated as a great victory by anti-nuclear groups in South Carolina. Some of them are not concerned with jobs anyway; many have avoided jobs all their lives."

Riley aides accused Hodel of taking a cheap shot at Riley, who some Republicans consider a possible challenger to Thurmond in 1984.

As a result of Hodel's decision, Riley and Derrick have spent recent weeks showcasing their support for the proposed new reactor in Aiken and surrounding areas.

At a groundbreaking for a new, $900 million nuclear-waste conversion plant at the Savannah River Plant last week, Riley challenged Hodel directly.

"I don't know of any reason why it (the new reactor) should go elsewhere," said Riley, as Hodel sat nearby on the speaker's platform.

In Washington, Thurmond blocked money for environmental impact studies of the Washington and Idaho sites Hodel had recommended. That put Thurmond in the odd posture of fighting his own party. Sen. James McClure, R-Idaho, has lobbied the Energy Department to build the reactor in his state. McClure is chairman of the Senate Energy Committee, which monitors the Energy Department.

After last week's groundbreaking, Hodel said he has put the Savannah River Plant (SRP) back on the list of possible sites.

"I honestly don't see how SRP could have ever been out of the running," said state Sen. Tom Moore, D-Aiken, last week. "You've got the technology and the personnel and the engineering here. You've got a waste-processing facility ready to go. What are they going to do with the waste in Idaho, build another $900 million waste facility?"

Environmentalists say they aren't necessarily opposed to the new reactor, if it's built and operated safely.

"Given the fact that this will be a state-of-the-art facility, presumably safer, and the fact that they are going to go ahead and build it somewhere anyway, I can [illegible] here," said John Lawson, executive director of the Columbia-based Energy Research Foundation.

Lawson isn't critical of Riley, who as governor has tried to walk a tightrope between the state's traditional hospitality to all nuclear projects and a push for stricter safeguards.

e State/Columbia, S.C., Thursday, August 11, 1983 ••11-C

Idaho Likely Site For Reactor Project

Associated Press

IDAHO FALLS, Idaho

Energy Secretary Donald Hodel has recommended an Idaho site for the New Production Reactor, a $4 billion project that could bring up to 4,000 construction jobs to the state over the next decade, Sen. James McClure, R-Idaho, announced Wednesday.

Hodel

Idaho's National Engineering Laboratory, a 550,000-acre nuclear research installation, was one of three sites under consideration for the project. A blue-ribbon panel of scientists and experts recommended placing it at the Savannah River Plant in South Carolina.

But McClure said Hodel advised him Wednesday he's decided the project should go to INEL in eastern Idaho. McClure told a news conference Hodel approved using existing technology, the so-called "heavy water" process rather than a gas-cooled process.

The plant is to produce nuclear material used in hydrogen bombs. It's a breeder reactor, meaning it produces more nuclear material than it consumes in nuclear reactions.

As a by-product, the plant is to produce electricity equivalent to the production from a 1,000-megawatt generating plant.

Dennis Donnelly of Pocatello, a spokesman for the Pocatello Center for Peace and Justice, said Hodel's decision "casts Idaho as a future weapons production center."

But state Rep. Gary Paxman, R-Idaho Falls, who played a prominent role in the Idaho Legislature's endorsement of the project, said it will bring a big economic boom, not only to Idaho but surrounding states.

Paxman led floor debate for the pro-NPR resolution. At one point, he even drank processed water from an INEL facility, to prove it was not dangerous and did not contain radioactivity.

While McClure declined to say it was "a certainty" that Idaho will get the project, he said Hodel's announcement was "very significant." The Idahoan is chairman of the Senate Energy and Natural Resources Committee.

"I'm delighted that the single biggest recommendation on the New Production Reactor now has been made," said McClure. "While it's very significant, the struggle to see actual construction begin is not over."

McClure said the Department of Energy will begin management plans and an environmental impact study on a huge nuclear reactor installation.

Eastern Idaho groups supported the project, saying the state needs the economic boost it would bring.

Anti-nuclear groups, such as Idaho's Groundwater Alliance and the Snake River Alliance, opposed the project in testimony before the legislature this spring.

The legislature eventually approved resolutions favoring the project. Anti-nuclear groups said more hydrogen bombs are unnecessary and there's no way to handle the plant's nuclear waste.

They also said they feared it could lead to nuclear contamination of the Snake River Aquifer, a vast underground waterway that runs through the area.

McClure said the project could mean 3,500 to 4,000 construction jobs through 1995, when the plant is scheduled to be in operation. He said it's to have a permanent operating force of about 2,000.

McClure said it will take 12 to 18 months to complete the environmental and management studies, funded by the DOE.

After that, it will be "a presidential decision" whether to go ahead with the project, and up to Congress to provide funding, McClure said.

He said Idaho was "a very distant third" after an earlier report favored the Savannah River site in South Carolina, followed by the Hanford installation near Richland, Wash.

The State

Ben R. Morris
Publisher

R. Sidney Crim
General Manager

William E. Rone Jr.
Editorial Page Editor

Thomas N. McLean
Executive News Editor

Robert A. Pierce
Associate Editor

Charles L. Byars
Managing Editor

Charles Wickenberg Jr.
Associate Editor

8-A Columbia, South Carolina, Tuesday, October 4, 1983

Hodel Misreading 'Signals' From State

IF U S Secretary of Energy Donald Paul Hodel believes South Carolina is hostile toward the government's nuclear weapons development program, then both he and the state have a problem of communication

In a lengthy interview with *The State* and *The Columbia Record* last week, the Secretary said he'd marked South Carolina off his list of sites for a new multibillion-dollar production reactor. He said he'd "received more than a few signals that we are not welcome here any longer" Mr Hodel favors a site at federal facilities in Idaho or Washington.

Mr Hodel's "signals" included the insistence by two state officials, Gov Dick Riley and Atty. Gen Travis Medlock, along with environmental protection groups, that an old reactor at the Savannah River Plant, scheduled for restarting this month, be subject to an Environmental Impact Statement (EIS) first

There was a good deal of controversy and the pro-EIS interests won The EIS process, a costly one which the Department of Energy did not think necessary, is in its final stages, and the reactor is being prepared for start-up The government says the restart is needed to provide materials for America's nuclear arsenal.

Other "signals" Mr Hodel interpreted as hostile were some 50 000 petitions from the non-profit Energy Research Foundation opposing further nuclear waste storage in South Carolina, and efforts by the S C Department of Health and Environmental Control to increase its regulatory authority over the Savannah River Plant

DONALD HODEL

Mr. Hodel said that Governor Riley was not supportive of the new production reactor, which will replace the old reactors like the ones of the Savannah River Plant, but U S Sen. Strom Thurmond had asked him to keep South Carolina on the site list: "I've been assured by Senator Thurmond I've heard from only one point of view"

There is no question that the political climate in South Carolina concerning nuclear matters has changed, but the change is not for the worse If Mr Hodel, is a believer in "states' rights," as he says he is, then he must consider that South Carolina's leaders are obliged to make sure their citizens' welfare is guarded and respected

There was absolutely nothing unreasonable or improper about seeking an EIS for the old reactor, the state is entitled to the assurances of environmental and public safety The Department of Energy's error was in not going after the full EIS in the first place, and then stonewalling the public

At no point has a state official objected to the nation's nuclear weapons program Governor Riley has not opposed the location of the production reactor at the Savanthe Savannah River Plant? If the new reactor is placed at the plant, will the Republican senator get the credit?

Some observers may sense political undertones in Mr. Hodel's comments; he responds to a friendly Republican senator and criticizes the Democratic governor If Mr Hodel takes the production reactor to the Northwest, from whence he hails, can Mr Riley be blamed for losing 4,000 construction jobs and 2,000 positions for South Carolina workers at the Savannah River Plant?

The Secretary and the Governor should talk things over to be sure they understand one another.

RECORD 7/29/83

Energy Secretary Donald Hodel

Columbia Newspapers photo

Energy secretary: S.C. won't get nuclear reactor

By Brian K. Duncan
Staff writer

South Carolina is not presently in the running for a new defense reactor because the state has sent clear signals to Washington that it is no longer interested in the nation's nuclear weapons program, Energy Secretary Donald Hodel said today

"I've received more than a few indications we are not welcome here," Hodel, who was in Columbia today to address the Tri-State Energy Conference, said in an interview prior to his speech

"But I've been assured by Sen (Strom) Thurmond I've heard from only one point of view"

The Energy Department plans to build a multi-billion dollar production reactor to meet the nation's future nuclear weapons needs And while a blue-ribbon panel recommended locating the reactor at the Savannah River Plant, where support facilities exist, Hodel ordered an environmental assessment to determine the suitability of building the reactor at the Idaho National Engineering Laboratory

> 'I've received more than a few indications we are not welcome here. But I've been assured by Sen. (Strom) Thurmond I've heard from only one point of view.'
>
> — Donald Hodel

SRP now produces almost all of the weapons-grade materials for nuclear bombs, and the only other production reactor, at the federal government's Hanford facility in Washington state, will soon be forced to shut down

"At that point, we'll have all of our eggs in the SRP basket" Hodel said He said that was a major consideration in looking for another site But he acknowledged the hard-line stand the state of South Carolina took to force the department to conduct an environmental impact statement before starting the mothballed L-reactor at SRP was a key factor in his decision

Public hearings on a draft of the L-reactor environmental study will be held next month, and Hodel said the outcome of those hearings might have some bearing on whether he will recommend that SRP be included in the study for the new reactor

Hodel said for whatever reason

(See Hodel 12-A)

Gov Dick Riley "has not been exactly supportive of a new production reactor"

Hodel said he has "received enormous pressure from states who are desirous of the billons of dollars of investment and the thousands of jobs" the new reactor would create

And he added "I believe we ought not to be forcing programs on states that don't want them"

In a wide-ranging discussion, Hodel said the nation must eventually "wake-up" to the fact that commercial nuclear power is needed for a well-balanced energy program He said the United States increased the possibility of nuclear proliferation by leaving the reprocessing of spent nuclear fuel to other countries

Hodel also said he was required by law to reject Riley's request to exclude South Carolina from consideration for a waste repository

He said a provision in the Nuclear Waste Policy Act of 1982 that excludes states from consideration if they already contain atomic waste facilities applies only to commercially generated wastes and not to the 30 million gallons of high-level defense wastes being stored temporarily in underground tanks at SRP

South Carolina is one of 17 states in the eastern half of the nation being considered to house an underground repository for high-level wastes

Hodel also said he has reservations about the federal government providing South Carolina with funding to monitor operations at SRP

Earlier this year, the Environust insist that the future of SRP be a major issue ear. Please keep in mind the following

sent office holders will do all within their power to hold the bad news until after the election. We sist on a favorable resolution of the new ctor location BEFORE election day or we lose st of our leverage

sent office holders will try to discuss anything but re the new reactor is going. We must keep them track

tion years are the best times to exert political ssure. BUT YOU MUST BE HEARD NOW!

Aiken
County
Republican
Party

P O Box 761
Aiken, S C. 29802
(803) 648-5626

ENCLOSURE #4

Savannah River Plant

Its Future is in your hands.

Savannah River Plant

The Savannah River Plant (SRP) produces and sustains some 20,000 direct and associated jobs in the Central Savannah River Area. It appears likely that these jobs will be lost because of unreasonably harsh enforcement of environmental rules by the governor and his state agencies. We must insist that our state government accept the more difficult dual job of protecting our jobs as well as our health and environment. This item should be the major issue during the 1984 elections.

THE SAVANNAH RIVER PLANT (SRP). The Savannah River Plant is really a collection of interrelated industries located on some 200,000 acres in Aiken, Barnwell and Allendale counties. It is part of a larger complex whose purpose is to maintain the thermonuclear stockpile of the United States. Most of the voters in the area do not understand how this complex functions and why the whole SRP operation will be lost if new reactors are built elsewhere in the larger complex.

SRP basically does three things. Reactor fuel pieces are fabricated from uranium and other metals. These fuel pieces are irradiated in one of five reactors. The irradiated fuel pieces are dissolved and product is separated from radioactive fission products. A fourth process is planned that will cast the fission products in large glass cylinders that can be safely stored for the next million years.

This process is similar to a coal power station that compresses coal dust into bricks (fuel fabrication), burns them in a furnace (irradiation in a reactor) and then extracts slag for farm use from the ashes (product separation).

The main point is that if the SRP reactors are shut down the whole plant is lost. It's like shutting down the furnace in the power plant: with no furnaces, there is no need to fabricate fuel, and there is no ash from which to extract product.

NEW PRODUCTION REACTOR. The SRP reactors are over 30 years old. With present technology newer more efficient reactors can be made. Several years ago plans were started for a new reactor with a capacity equal to all of the present SRP reactors. In November of 1982 the DOE announced that SRP would be the location for the new reactor; that was the good news. In the same month we elected Mr. Medlock to be our attorney general and several groups of anti-SRP environmentalists initiated lawsuits against SRP. That was the bad news.

In January of 1983, Attorney General Medlock took office and brought the state into the anti-SRP lawsuit. We now have our attorney general suing our major industry with our money to kill off 20,000 local jobs! In April the attorney general was quoted in the State newspaper as saying that he was cleaning up SRP. And the state legislature passed a resolution supporting all this anti-SRP activity. Toward the end of the summer the DOE announced that the new reactor was going to Idaho.

All this might be understandable if SRP had hurt anyone or done significant damage to our environment. In fact after months of the most careful study by state agencies, environmentalists, state lawyers and all, the major problem identified has been the hot water from the reactors. This water is no more dangerous than what comes out of your hot water tap. For 30 years this water has run down some wet weather streams on the plant site and has killed a few trees and cooked a few mud worms. On the other hand, bass and local alligators enjoy the warm water in the winter.

But on with the story. In December a group of local politicians flew to Washington to meet with the Secretary of Energy to request the return of our reactor to SRP. Our governor did not bother to go. As recently as April of this year, the SC Democrat party that rules our state passed a series of strongly anti-SRP resolutions at their state convention.

Our Washington contacts tell us four things. If the decision were made today, our new reactor would go to Idaho. This bad news will be withheld until after the November elections to protect present office holders. Without the new reactors, the long-term future of SRP is bleak. And there is not much that they in Washington can do as long as the state Democrats maintain their present negative attitude.

Please understand that we all feel that we do need to protect our health and environment. But our state government must accept and accomplish the more difficult dual job of protecting our jobs as well. None of us wants to live in a garbage heap. Nor will we enjoy a squeaky clean environment while we stand in line for food stamps.

IMPACT OF LOSS OF SRP. The day it is announced that the new reactor will go to Idaho (or Washington), long-term mortgage money will become more difficult to obtain, business expansions will be put off and a blight will settle over our local economy. New construction at SRP will be rescheduled for the new location. (Why build anything new at a plant about to be shut down? Why put up with unreasonable hostility from the state of SC when other states are anxious to enforce environmental laws in a way that protects jobs as well as the environment?)

When the new reactor is completed in ten years or so, SRP closes and 20,000 people are unemployed. These poor souls will swamp the job market within driving distance. All jobs within 100 miles of SRP will be threatened. 100 lawyers will be competing for business. 100 doctors will consider relocating. 10,000 skilled workers of all sorts will fan out over the country willing to do almost anything to meet their monthly bills. The state will lose $20 million in taxes while paying a hundred million or so in benefits. Crime will rise. All this has been tragically demonstrated elsewhere in the US when major industries close.

WHAT TO DO? We must send an immediate message to Columbia and Washington that we do value our high paying, high tech SRP jobs. The mechanism for this vital communication is at hand. This is the year of the big election. We suggest a clean sweep. If NO Democrat were elected in Aiken County in November, this would be a message most clearly understood by all — from Columbia to Washington!

Mr. DERRICK. In an attempt to summarize the salient issues and concerns I have in this situation, it is necessary for me to detail the sequence of events relating to both the restart of the L reactor at the Savannah River plant, as well as efforts to initiate an EIS on the new production reactor—a chronology of these events appear at the end of my testimony.

During the late 1970's and early 1980's, considerable amounts of Federal funds were expended to rehabilitate the previously shutdown L reactor at the Savannah River plant to provide additional production capacity for nuclear defense materials requirements. And I would note that I convinced then President Carter to restart the L reactor, rather than embark on construction of any new production capacity.

A "finding of no significant impact" was issued by the Department of Energy on November 8, 1982, and was based on an August 1982 environmental assessment of the impacts associated with restart of the L reactor;

This finding of no significant impact was challenged by parties in and around the State—the plaintiffs asserted that restart of the reactor was a major federal action with significant potential environmental impacts, for which a full environmental impact statement should be mandated.

I would also note parenthetically at this point that in every discussion I had with Department of Energy officials during this period, I urged them to perform a full EIS even if they believed the technical language of the statute did not so require.

In January 1983, the State of South Carolina formally joined the pending litigation as plaintiffs against the Department of Energy as a result of State official's concerns over the restart of the reactor without proper mitigation of potential environmental damage.

At this point, Mr. Chairman, I also need to correct an error in my previous letter to the chairman. In that letter I indicated that the State ultimately withdrew from the suit over the L reactor—page 3, paragraph 6. Although there were negotiations leading in this direction, the parties did not reach final agreement and the State remained a party plaintiff throughout the action. It was this action, the State's involvement in the lawsuit over the L reactor, that apparently precipitated much of what occurred subsequently.

As a result of legislative language incorporated in several bills mandating a full EIS on the L reactor restart, as well as a Federal district court order to comply with the National Environmental Policy Act by performing a full EIS resulting from the suit against DOE, the Department of Energy was compelled to perform an EIS. The EIS issued in May 1984, the record of decision on July 6, and mitigation acceptable to all parties is presently being constructed in anticipation of restart.

As the L reactor controversy was moving toward resolution, an announcement was made that an EIS on the new production reactor would be conducted at the Idaho National Engineering Laboratory. As I have noted, the public release of this decision was made by the senior Senator from Idaho on June 10, 1983, and the DOE press release on the same was dated June 11th.

The DOE press release of June 11, 1983, is itself a curious document. In it, the DOE noted that they would also look at the Hanford Reservation as an alternate site for the NPR in the EIS process. The release made no mention of the Savannah River plant, presently the primary source of production of the materials the new production reactor will ultimately produce. The press release had another funny twist: The release made reference to the findings of a blue-ribbon panel assembled by DOE to study siting and reactor design issues. The major findings of this panel—the so-called Glennan Panel, which reported to the Secretary on November 15, 1982—that the Savannah River plant was the most appropriate place to site the new production reactor—were completely omitted, while the report was used to justify the choice of reactor design only.

Throughout the next 1½ years, the DOE announcement was used to considerable political advantage in both Idaho and South Carolina—to the advantage of the incumbent running for reelection in the former, and against incumbents in the latter.

Then, some 2 months after the general election, the former Secretary of Energy indicated in a court affidavit that he had determined as early as June of last year that ". . . it would not be feasible to make a recommendation on any proposal for a new production reactor or its alternatives by mid-1985."

Mr. Chairman, throughout my race for reelection, I can assure you that the new production reactor was an issue in that part of my congressional district surrounding the Savannah River plant. My only response to the rhetoric used by my opponent was one letter to the editor in which I urged that the U.S. Nuclear Defense Program was simply too important to become an issue of partisan politics.

I am very sincerely concerned over the precedent this misuse of the Nation's defense program has set for the future—to the extent that critically important projects such as the new production reactor are used as political prizes, our commitment to the necessary production of nuclear defense materials will be greatly weakened.

Mr. Chairman, I cannot present you with a smoking gun which unequivocally establishes what I have asserted above. I can, however, offer the perspective of a politician who has served throughout the period that these events have taken place, and I believe I have presented very significant circumstantial evidence that at best this project has been used in a very improper partisan way—and at worst it may never have been the intention of the Department of Energy to construct and/or actually perform an EIS on the project in Idaho at all!

It is for these reasons that I have requested your committee, as well as the House Energy and Commerce Committee, to fully investigate this matter. To facilitate your inquiry, I would suggest the following avenues of investigation:

Why was the initial decision for an EIS at the Idaho site announced by the senior Senator from Idaho a full day before the official DOE press announcement?

Why did the August 11, 1983, DOE press release not mention the Savannah River plant as a site to be considered in an EIS conducted for siting the new production reactor at Idaho—only Hanford was mentioned; and why was the major finding of the Glennan Panel omitted—that the Savannah River plant was the most advantageous site, and Idaho the least—while the report was otherwise cited as justification for the Secretary's decision on reactor design? In this connection, it may be of value to the committee to call T. Keith Glennan, Chairman of the New Production Reactor Concept and Site Selection Advisory Panel, to offer his own observations as an expert on this subject.

What other technical review—in addition to the study noted above—has the department made regarding the siting of the New Production Reactor;

What is the precise funding level proposed for the New Production Reactor in Fiscal Year 1986, and for what specific program functions are the monies to be spent;

Why was the Secretary's decision to not move forward with the New Production Reactor project, as evidenced in the January 15, 1985, court affidavit, not made known to interested parties on Capitol Hill soon after it was made—allegedly in June 1984. In this regard, I would inquire whether this or any other House committee was even made aware of this change in program course;

Why did Secretary Hodel feel it necessary to indicate that the New Production Reactor project was not going to the Savannah River Plant.

Mr. Chairman, in closing let me just indicate that throughout this process I have called for only one thing: Once the decision is made to move forward with the New Production Reactor, that any siting decision fully and fairly consider the Savannah River Plant. My own perception has been that there can be no logical reason for siting the reactor anywhere but SRP.

The realities of a $4 billion construction project are obvious to all those who would seek to use it for political advantage. Quite frankly, the events of the last 24 hours come as little surprise—the Savannah River Plant is the only reasonable and safe place to conduct these operations. I am quite naturally pleased that the Department of Energy has finally acknowledged this reality, although I must call into serious question the process by which they have reached this result.

If they believe they have strengthened the status of the defense program by polarizing this issue in partisan political debate, they are wrong.

If they believe they have mollified the citizens of Idaho who were offered a $4 billion election year prize, they are wrong.

And if they believe they have weakened my determination to see that this process receives the full light of day, they are wrong.

As a final note, Mr. Chairman, I think it behooves me to reassert the right of my State of South Carolina, or any State in the United States, to challenge the operation of a Federal facility within their borders. The Department of Energy was clearly wrong on the law and on the policy embodied in U.S. environmental and clean water statutes in connection with the L Reactor restart.

Mr. Chairman, thank you again for affording me this time to appear before you today. I would be more than happy to answer any questions you or your colleagues might have, and I look forward to working with you in whatever direction this committee chooses to pursue this matter.

PREPARED STATEMENT OF HON. BUTLER DERRICK

Mr. Chairman, thank you for providing me with time today to appear before you and your colleagues on the Subcommittee on Procurement and Military Nuclear Systems regarding the FY'86 funding requests submitted for the Department of Energy's Atomic Energy Defense Activities.

My comments this afternoon will address issues primarily related to the New Production Reactor project, the "next-generation" nuclear reactor for production of materials for the U.S. nuclear defense weapons program.

At the outset, Mr. Chairman, I should note that it is my understanding that the Department of Energy did make some determination about the future course of this project yesterday. I was apprised of this action yesterday evening, through secondhand sources, although I understand the information was selectively released to certain Members of Congress. I assume the committee has been briefed on this matter in full detail, and would welcome any information that may be available. On the basis of the information I have reviewed from this mornings newspapers from South Carolina, it is claimed that a scaled-down New Production Reactor is expected to be constructed at the Savannah River Plant somewhere around the turn of the century.

Mr. Chairman, from the exchange of correspondence and colloquy we had on the House floor last year, you are no doubt well aware of my interest and concerns regarding the New Production Reactor.

Moreover, I have come to the conclusion that the Department of Energy, and specifically former Secretary Hodel, used public statements regarding decisions related to the siting for this reactor for partisan political purposes over the course of the last two years. Specifically, the Secretary's announcement of June 11, 1983, that an Environmental Impact Statement for the New Production Reactor would be conducted at the Idaho National Engineering Laboratory was originally announced at a press conference held by the senior Senator from Idaho, and was an issue of considerable political impact during that Senator's reelection campaign.

At the same time, Secretary Hodel, in public statements made in the State of South Carolina, indicated that the New Production Reactor would not be located in South Carolina because officials of my State were willing to challenge the Department's intransigent and legally indefensible position of refusing compliance with the preeminent environmental statute in the United States—the National Environmental Policy Act—on a separate on-going project at the Savannah River Plant. This state action, as misinterpreted by the Secretary of Energy, led him to the conclusion that the State was no longer "receptive" to the Savannah River Plant, and that as a penalty for the State's involvement in a lawsuit against his Department, he would exact retribution by sending the New Production Reactor to another site.

Therefore, not only was the Secretary able to use this siting decision to the advantage of an incumbent Senator and Chairman of the Senate Committee on Energy and Natural Resources, but he also attempted to point the finger at elected officials in South Carolina for creating an environment which the Secretary attempted to characterize as hostile to the interests of the Savannah River Plant.

Mr. Chairman, what has concerned me most about this entire situation and lead me to pursue this matter to the degree that I have is that in an affidavit filed in the U.S. District Court for the District of Columbia, on January 15, 1985, former Secretary Hodel stipulated that as early as June of last year, he had "determined that it would not be feasible to make a recommendation on any proposal for a new production reactor or its alternatives by mid-1985." This decision, if made in June of 1984, occurred one full year after the secretary had already stated his intention to perform an EIS on siting the new production reactor at the Idaho site. And if this decision not to move forward with the new production reactor was indeed made in June of 1984, why did it not become public information until January, 1985—two months after a general election in which the issue figured prominently in state and local elections in both Idaho and South Carolina.

Mr. Chairman, as you are aware, I forwarded correspondence to the Chairman of the full committee in late January, which provided greater detail regarding this situation. I request that my letter to the Chairman of January 27, 1985, with enclosures, be entered into the record of this hearing.

In an attempt to summarize the salient issues and concerns I have in this situation, it is necessary for me to detail the sequence of events relating to both the restart of the L-Reactor at the Savannah River Plant, as well as efforts to initate an EIS on the New Production Reactor (a chronology of these events appear at the end of my testimony):

THE L-REACTOR RESTART

During the late 1970's and early 1980's, considerable amounts of Federal funds were expended to rehabilitate the previously shut-down L-Reactor at the Savannah River Plant to provide additional production capacity for nuclear defense materials requirements (and I would note that I convinced then-President Carter to restart the L-Reactor, rather than embark on construction of any new production capacity);

A "Finding of No Significant Impact" was issued by the Department of Energy on November 8, 1982, and was based on an August, 1982 Environmental Assessment of the impacts associated with restart of the L-Reactor;

This "Finding of No Significant Impact" was challenged by parties in and around the State—the plaintiffs asserted that restart of the reactor was a Major Federal Action with significant potential environmental impacts, for which a full Environmental Impact Statement should be mandated (I would also note parenthetically at this point that in every discussion I had with Department of Energy officials during this period, I urged them to perform a full EIS even if they believed the technical language of the statute did not so require);

In January, 1983, the State of South Carolina formally joined the pending litigation as plaintiffs against the Department of Energy as a result of State official's concerns over the restart of the reactor without proper mitigation of potential environmental damage. At this point, Mr. Chairman, I also need to correct an error in my previous letter to the Chairman. In that letter I indicated that the State ultimately withdrew from the suit over the L-Reactor (page 3, paragraph 6). Although there were negotiations leading in this direction, the parties did not reach final agreement and the State remained a party plaintiff throughout the action. It was this action, the State's involvement in the lawsuit over the L-Reactor that apparently precipitated much of what occurred subsequently;

As a result of legislative language incorporated in several bills mandating a full EIS on the L-Reactor restart, as well as a Federal District Court order to comply with the National Environmental Policy Act by performing a full EIS resulting from the suit against DOE, the Department of Energy was compelled to perform an EIS. The EIS issued in May 1984, the Record of Decision on July 6th, and mitigation acceptable to all parties is presently being constructed in anticipation of restart.

THE NEW PRODUCTION REACTOR

As the L-Reactor controversy was moving towards resolution, an announcement was made that an EIS on the New Production Reactor would be conducted at the Idaho National Engineering Laboratory. As I've noted, the public release of this decision was made by the senior Senator from Idaho on June 10, 1983, and the DOE Press Release on the same was dated June 11th;

The DOE Press Release of June 11, 1983 is itself a curious document. In it, the DOE noted that they would also look at the Hanford Reservation as an alternate site for the NPR in the EIS process—the release made no mention of the Savannah River plant, presently the primary source of production of the materials the new production reactor will ultimately produce. The press release had another funny twist: the release made reference to the findings of a blue-ribbon panel assembled by DOE to study siting and reactor design issues. The major findings of this panel (the so-called Glennan Panel, which reported to the Secretary on November 15, 1982)—that the Savannah River plant was the most appropriate place to site the new production reactor—were completely omitted, while the report was used to justify the choice of reactor design only.

Throughout the next year and a half, the DOE announcement was used to considerable political advantage in both Idaho and South Carolina—to the advantage of the incumbent running for reelection in the former, and against incumbents in the latter.;

Then, some two months after the general election, the former Secretary of Energy indicated in a court affidavit that he had determined as early as June of last year that ". . . it would not be feasible to make a recommendation on any proposal for a new production reactor or its alternatives by mid-1985."

Mr. Chairman, throughout my race for reelection, I can assure you that the New Production Reactor was an issue in that part of my Congressional district surrounding the Savannah River Plant. My only response to the rethoric used by my opponent was one Letter to the Editor in which I urged that the U.S. nuclear defense program was simply too important to become an issue of partisan politics.

I am very sincerely concerned over the precedent this misuse of the nation's defense program has set for the future—to the extent that critically important projects such as the New Production Reactor are used as political prizes, our commitment to the necessary production of nuclear defense materials will be greatly weakened.

Mr. Chairman, I can not present you with a "smoking gun" which unequivocally establishes what I have asserted above. I can, however, offer the perspective of a politician who has served throughout the period that these events have taken place, and I believe I have presented very significant circumstantial evidence that at best this project has been used in a very improper partisan way—and at worst it may never have been the intention of the Department of Energy to construct and/or actually perform an EIS on the project in Idaho at all!

It is for these reasons that I have requested your committee, as well as the House Energy and Commerce Committee, to fully investigate this matter. To facilitate your inquiry, I would suggest the following avenues of investigation:

Why was the initial decision for an EIS at the Idaho site announced by the senior Senator from Idaho a full day before the official DOE press announcement;

Why did the August 11, 1983 DOE press release not mention the Savannah River Plant as a site to be considered in an EIS conducted for siting the New Production Reactor at Idaho (only Hanford was mentioned); and why was the major finding of the Glennan Panel omitted—that the Savannah River Plant was the most advantageous site, and Idaho the least—while the report was otherwise cited as justification for the Secretary's decision on reactor design. In this connection, it may be of value to the Committee to call T. Keith Glennan, Chairman of the New Production Reactor Concept and Site Selection Advisory Panel to offer his own observations as an expert on this subject;

What other technical review (in addition to the study ncted above) has the Department made regarding the siting of the New Production Reactor;

What is the precise funding level proposed for the New Production Reactor in Fiscal Year 1986, and for what specific program functions are the monies to be spent;

Why was the Secretary's decision to not move forward with the New Production Reactor project, as evidenced in the January 15, 1985 court affidavit, not made know to interested parties on Capitol Hill soon after it was made (allegedly in June, 1984). In this regard, I would inquire whether this or any other House Committee was even made aware of this change in program course;

Why did Secretary Hodel feel it necessary to indicate while in South Carolina that the New Production Reactor project was not going to the Savannah River Plant.

Mr. Chairman, in closing let me just indicate that throughout this process I have called for only one thing: once the decision is made to move forward with the New Production Reactor, that any siting decision fully and fairly consider the Savannah River Plant. My own perception has been that there can be no logical reason for siting the reactor anywhere but SRP.

The realities of a $4 billion construction project are obvious to all those who would seek to use it for political advantage. Quite frankly, the events of the last twenty-four hours come as little surprise—the Savannah River Plant is the only reasonable and safe place to conduct these operations. I am quite naturally pleased that the Department of Energy has finally acknowledged this reality, although I must call into serious question the process by which they have reached this result.

If they believe they have strengthened the status of the defense program by polerizing this issue in partisan political debate, they are wrong!

If they believe they have mollified the citizens of Idaho who were offered a $4 billion election year prize, they are wrong!

And if they believe they have weakened my determination to see that this process receives the full light of day, they are wrong!

As a final note, Mr. Chairman, I think is behooves me to reassert the right of my State of South Carolina, or any State in the U.S., to challenge the operation of a Federal facility within their borders. The Department of Energy was clearly wrong on the law and on the policy embodied in U.S. environmental and clean water statutes in connection with the L-Reactor restart.

Mr. Chairman, thank you again for affording me this time to appear before you today. I would be more than happy to answer any questions you or your colleagues might have, and I look forward to working with you in whatever direction this committee chooses to pursue this matter.

CHRONOLOGY

Date	L-Reactor	New production reactor
Late 1970's	Carter decision to rehabilitate the L-Reactor at SRP to meet increased defense materials requirements.	
August 1982	Draft Environmental Assessment (EA) issued by DOE on restart of L-Reactor.	
Aug. 20, 1982	"Finding of No Significant Impact" issued by DOE on basis of EA.	
Nov. 8, 1982	Suit entered against DOE by Natural Resources Defense Council (NRDC) et. al., regarding adequacy of the "Find-of No Significant Impact".	
Nov. 15, 1982		DOE-appointed Glennan Panel (Concept and Site Selection Advisory Panel) recommendation to Secretary Hodel favoring SRP reactor design and SRP site for New Production Reactor (NPR).
January 1983	State of South Carolina joined pending suit against DOE (see above).	
Feb. 9, 1983	Senate Armed Services Committee hearing in North Augusta, South Carolina: "Environmental Consequences of the Proposed Restart of the L-Reactor at the Savannah River Plant, Aiken, South Carolina.	
May 1983	Second set of Senate Armed Services Committee hearings (similar to above), followed by 90-day public comment period.	
June 10, 1983		Senator McClure press conference to announce EIS will be conducted on siting NPR at Idaho National Engineering Laboratory (INEL).
June 11, 1983		DOE Press Release to Announce EIS for NPR at INEL.
Summer 1983	Legislative riders added to FY'83 Supplemental Appropriations, and FY'84 Energy and Water Development Appropriations bills mandating EIS on L-Reactor restart.	
July 19, 1983	DOE announces institution of EIS on L-Reactor restart.	
August 1983	Federal District Court Judge orders 6 month delay in the L-Reactor restart pending completion of EIS by DOE.	
September 1983	Draft EIS on restart of L-Reactor released by DOE.	
Do		Secretary Hodel, in South Carolina, makes following remarks to reporters: "I've received more than a few indications we are not welcome here"; Gov. Riley "has not been exactly supportive of a new production reactor"; and He (Sec. Hodel) has "received enormous pressure from states who are desirous of the billions of dollars of investment and the thousands of jobs" (Columbia Record, Sept. 29, 1983).
May 1984	Final EIS on restart of L-Reactor issued	
July 6, 1984	Record of Decision on Final EIS issued by DOE recommending mitigation of thermal discharges from L-Reactor.	
July 17, 1984	Suit initiated by NRDC et. al., against DOE for failure to initiate an EIS on the NPR within 30 days of announcement of such action, and to block expenditure of further funds until the EIS is initiated.	
Nov. 6, 1984	ELECTION DAY	

CHRONOLOGY—Continued

Date	L-Reactor	New production reactor
Jan. 15, 1985		Affidavit filed in U.S. District Court by Secretary Hodel, in response to suit mentioned above, indicating the DOE had backed off the NPR project.
Feb. 20, 1985		Announcement of NPR construction at SRP within next twenty years.

Mr. **Stratton**. Thank you very much, Mr. Derrick. It certainly is a very straightforward statement. As you have indicated, we had several exchanges on the floor of the House in the last Congress in connection——

Mr. **Derrick**. I might add, they were all friendly exchanges.

Mr. **Stratton**. We also have the letter which will appear in the record at the point you requested.

Mr. **Stratton**. Well, I think if nobody has any questions on this, I think we will ask the Department of Energy to make some statement in reply to the points that the gentleman from South Carolina has raised.

General Hoover, we would appreciate it if you could provide us with the department's response to these statements. I recognize Mr. Hodel is no longer the Secretary, but certainly there must be some rational explanation for the points that Mr. Derrick has raised. And I think he deserves a response to his queries.

Mr. **Hoover**. Yes. We would be happy to provide that.

Response to Testimony of Hon. Butler Derrick

Mr. Hoover. I am pleased to have the opportunity to respond to the comments made by the Honorable Butler Derrick concerning the Department's activities associated with a New Production Reactor and the L Reactor restart at the Savannah River Plant (SRP). I will respond on each of the specific issues stated in Congressman Derrick's testimony.

ISSUE

"Why was the initial decision for an EIS at the Idaho site announced by the senior Senator from Idaho a full day before the official DOE press announcement?"

ANSWER

On August 9, 1983, after a lengthy review of the planning information which had been compiled concerning a New Production Reactor, former Secretary of Energy Hodel decided to propose initiation of an environmental impact statement to aid in the decision process on this activity. He directed the Assistant Secretary for Defense Programs to initiate the process and selected the heavy water reactor concept and the Idaho National Engineering Laboratory site as the reference case. Other reactor concepts and sites were also to be evaluated, particularly the Hanford site because either the Idaho National Engineering Laboratory site or the Hanford site would continue to provide nuclear materials production site diversification when considered in combination with the Savannah River Plant.

In the course of starting the implementation of that process, discussions were initiated with those in Congress who would be most affected, and in parallel a departmental press release was prepared to provide the information to all interested parties as early as practical. A press release was issued by the senior Senator from Idaho the evening of August 10, 1983, after the Department's Washington, D. C. office had closed for the day, and the Department's press release was issued from the Washington, D. C. office the morning of August 11, 1983.

ISSUE

"Why did the August 11, 1983, DOE press release not mention the Savannah River Plant as a site to be considered in an EIS conducted for siting the New Production Reactor at Idaho (only Hanford was mentioned); and why was the major finding of the Glennan Panel omitted—that the Savannah River Plant was the most advantageous site, and Idaho the least—while the report was otherwise cited as justification for the Secretary's decision on reactor design. In this connection, it may be of value to the committee to call T. Keith Glennan, Chairman of the New Production Reactor Concept and Site Selection Advisory Panel, to offer his own observations as an expert on this subject."

ANSWER

The Glennan Panel considered the urgency for providing an assured, reliable supply of tritium at the earliest practical date to be an overriding consideration. The Panel concluded that this could best be achieved by:

Constructing a heavy water reactor, the type with which the Department has the greatest experience; siting it at the Savannah River Plant, the site having the greatest experience with this type reactor; and using the current Savannah River Plant operating contractor which the Panel considered to be best able to complete this type of reactor in the short timeframe of interest.

Former Secretary Hodel placed greater weight than the Glennan Panel on the need for site diversification for production of nuclear materials. The Savannah River reactors are not expected to reach the end of useful life until some time after the end of this century. However, the Hanford N Reactor, which currently provides nuclear materials production site diversification, is currently expected to reach the end of useful life in about 10 years unless major renovations are implemented. Accordingly, the focus of planning studies has been on replacing or assuring continuation of the capability which the Hanford N Reactor currently provides, thereby assuring through production site diversification that a reliable supply of tritium would continue to be available as the current Savannah River reactors become less operationally reliable with increasing age. After discussions with Chairman Glennan and others involved, Secretary Hodel concluded that he would satisfy the principal intent of the Panel recommendations and achieve continued site diversification as well by constructing a heavy water reactor at the Idaho National Engineering Laboratory site.

ISSUE

"What other technical review—in addition to the study noted above—has the department made regarding the siting of the New Production Reactor?"

ANSWER

Subsequent to the Glennan Panel, the Department initiated major studies to develop information concerning potential options for New Production Reactor concepts and sites. These are still in process. These studies are to develop improved cost estimates, nuclear safety analyses, and environmental data on three reactor concepts—heavy water, light water, and gas cooled—and three sites—Hanford, Idaho, and Savannah River. The studies to date have concentrated on large reactors, comparable in power to the largest commercial reactors being constructed in the United States today. The studies are now being broadened to consider smaller reactors of the same types, approximately 50 percent of the power level of the large reactors.

ISSUE

"What is the precise funding level proposed for the New Production Reactor in Fiscal Year 1986, and for what specific program functions are the monies to be spent?"

ANSWER

Fiscal Year 1986 funding of $6 million has been requested to continue the studies related to the New Production Reactor. Studies to date have developed data principally on three reactor concepts—heavy water, light water and gas cooled—and three sites—Hanford, Idaho National Engineering Laboratory and Savannah River Plant. The studies have focused on very large reactors, comparable in power to the largest commercial reactors currently being built in this country.

In addition to data on one large reactor, we now plan to develop data on smaller versions of these reactor concepts because of the greatly increased flexibility which two or more new smaller reactors could potentially provide for responding to changing materials requirements. Two or more new reactors spaced at intervals of a few years could ensure continuation of nuclear materials site diversification and provide for lower, more uniform annual funding requirements during the construction periods.

ISSUE

"Why was the Secretary's decision to not move forward with the New Production Reactor project, as evidenced in the January 15, 1985, court affidavit, not made known to interested parties on Capitol Hill soon after it was made—allegedly in June 1984. In this regard, I would inquire whether this or any other House committee was even made aware of this change in program course."

ANSWER

I would like to provide for the record an affidavit from former Secretary Hodel on this subject (the information follows). This was not considered a decision not to move forward with the New Production Reactor project. It was considered a decision which was responsive to concerns expressed by Congress that additional data and studies were necessary to support a decision to either move forward or not to move forward with a New Production Reactor. I understand that Secretary Hodel discussed these issues during the course of the past several months with the Chairmen and Staffs of our authorization committees, and discussions between the Department and the Congress are continuing at present.

ISSUE

"Why did Secretary Hodel feel it necessary to indicate that the New Production Reactor project was not going to the Savannah River Plant?"

ANSWER

The principal reason for considering sites other than the Savannah River Plant was the desire for diversification of sites for production of nuclear materials. However, at the time, the receptivity of the State of South Carolina to increased activities at the Savannah River Plant came into question during the preparations for restarting the L Reactor, particularly when the State continued its participation in the litigation concerning the restart of L Reactor even after execution of a Memorandum of Understanding between the Department and the State which provided for withdrawal of the State from that litigation. Under these conditions, the Secretary deemed it appropriate, considering the critical mission of the program, to consider locating the New Production Reactor at a site other than Savannah River. This issue was discussed fully with State officials, and ultimately resolved in favor of including South Carolina in the considerations. Additionally, the Department of Energy and the South Carolina Department of Health and Environmental Control have worked closely together since that time and have resolved successfully the States' concerns related to the restart of the L Reactor.

Mr. STRATTON. Thank you very much.

Mr. DERRICK. Thank you, Mr. Chairman, for allowing me to appear before you.

Mr. STRATTON. Thank you very much. Very eloquent statement. Our next witness will be Dr. George Dacey, president of the Sandia National Laboratories.

Dr. Dacey, we are glad to welcome you here. I recall the reception you gave the committee when we visited your installation not too long ago. With all of the rush time, I can't recall whether it was 1 year or 2 years, but it was the same time we were advised about the isotope separation experiment's success at Livermore.

So you may proceed in whatever way you care to.

STATEMENT OF GEORGE C. DACEY, PRESIDENT, SANDIA NATIONAL LABORATORIES

THREATS TO EXCELLENCE OF NATIONAL LABS

Dr. DACEY. Thank you very much, Mr. Chairman, and members of the committee. We are indeed pleased that you did come to see us and the other laboratories. It is especially pertinent, I think, to the kind of testimony I would like to give today, because I believe in a very serious way that this committee has an important role at the crossroads of what I consider to be a dangerous trend with regard to our national laboratories.

I believe that you will find what I have to say believable, for one reason because this is the last time I will be addressing this committee. The unfortunate march of time and the rules of the Bell System, which say that when you get to be 65, you will retire, will prevent me from addressing you again.

As you know, AT&T operates Sandia at no profit and no fee. They are not, therefore, particularly biased. In leaving, I am not giving you my last testament, but my last testimony, because I expect to be pretty active all the time after I retire. But I think my coming retirement gives me a certain amount of objectivity. I would like to build on that. I have spent the last 40 years of my life managing R&D and being managed in R&D, at Westinghouse and the Bell Laboratories plus two stints at Sandia, most recently as president, and I think I know something about what laboratories are doing in our country and why. And I am very much afraid that for a variety of reasons, which I will mention, the realization of the excellent thing that we have going for us in the national laboratories is not as clear in the minds of many people in this country, of the Congress, and even of the Department of Energy and the DOD as it might be.

In part, I think this is because we do have a lot of new people. General Hoover talked about a new team. You were welcoming new members here. We have a new Secretary of Energy. And where does the corporate memory, where does the recollection of why we have done these things, and why they work, reside? I believe it resides in the field, in the places which are actually doing the work.

I fear that there is, if not an attack, at least a set of operations underway which could threaten the good thing we have going for us. Now, what do I mean? We have a blue ribbon task force which, responding to the initiative by Senator Nunn and Senator Warner, is trying to see whether or not the DOE laboratories should somehow become funded by, or put under, the DOD. We have inspector general reports that question the congressional appropriations on various buildings because, they say, the management is not adequate or proper; that it ought to be done more from Washington and less from national laboratories. We have had a whole host of committee reports in the past, such as the Packard report and the President's Private Sector Survey on Cost Control, all of which are trying to look at whether the laboratories are being managed correctly or not, and whether we are doing the right thing.

THE RECORD OF THE NATIONAL LABORATORIES

I submit that one way of measuring whether the laboratories are being managed well or not is to look at the record and see whether they have done a good job over the years. And perhaps to see that they did a good job because they were managed in the way that they are. I remind you that the scientific community, beginning with Einstein's communication to Roosevelt, put highest emphasis on the nuclear weapons program during World War II. And they constructed, with the help of General Groves in the Manhattan District and later the AEC and great support from the joint Committees of Congress the best scientific establishment that this country has ever seen. The scientists, as a result, gave us the nuclear weapon itself and created the nuclear energy program that followed. We have not, I am sorry to say, been able to engage the scientific community's full participation since that time. I am sorry that some of my present day colleagues in science find themselves critical of our programs and of their own Government. But nevertheless, in the beginning, the scientific community was uniformly behind this program, and the seeds of that, the results of that, are with us today.

We have the best laboratories in the country.

NUCLEAR STOCKPILE RELIABILITY

Now I would like to show you a few pieces of evidence to demonstrate that. First, let us look at the nuclear stockpile itself. [Chart deleted.]

We have a stockpile with a reliability of [deleted]. This is an incredible accomplishment for any piece of complex apparatus, I can tell you from having designed all kinds of telephone equipment, which also has to be very reliable, that to get something which is [deleted] reliable is an enormous accomplishment. You will not find it in any DOD equipment, or any commercial equipment, anywhere else in our country.

Mr. **Stratton**. How do you make that calculation? Do you fire off everyone and then see how many didn't work?

Dr. **Dacey**. [Deleted.]

NUCLEAR WEAPON PRODUCTION RECORD

We seem to, these days, focus a lot on what is wrong. We focus on technical problems, on funding problems, on a variety of things which have happened. I would like to put that focus in some perspective. We are now back up to the highest level of production in the plants of nuclear weapons that we have ever had, coming up a very steep ramp from almost zero production. I think I need not mention to this group my personal views as to whether it was ever wise to go down in our production to such a low level while the Russians were going full speed ahead. Be that as it may, coming from that low level of production to a very high level, without making a single schedule slip, is a tremendously remarkable technical accomplishment.

The bottom line is that the system is working very well, rather than very badly. And we ought to worry about that criticism more than individual problems.

IOC SLIPS

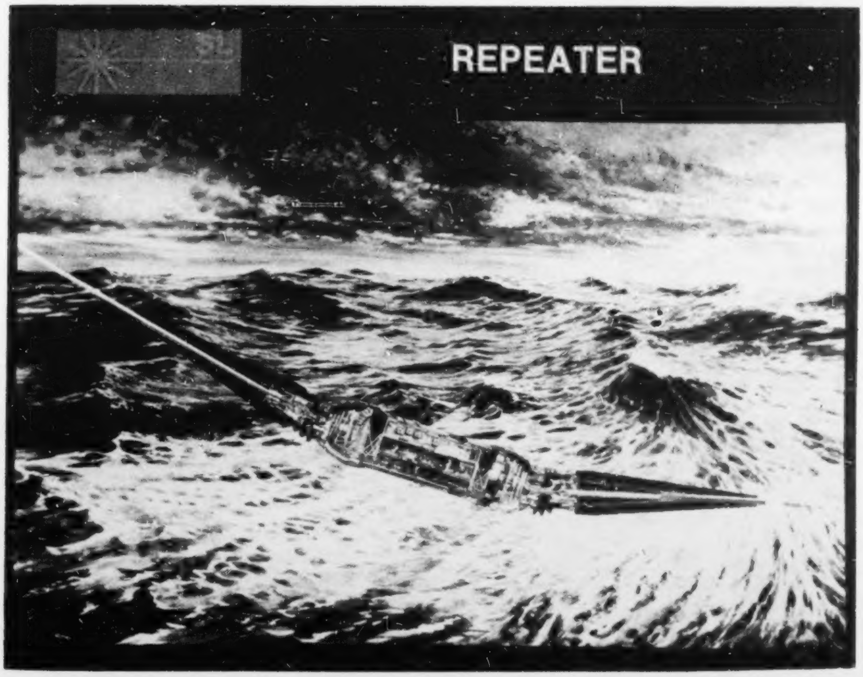
	Technical Problems		Funding Problems		Other Causes	
	DOD	DOE	DOD	DOE	DOD	DOE
1960 thru 1969	8 Systems 74 Months	1 System 11 Months	None	None	5 Systems 89 Months	2 Systems 5 Months
1970 thru 1979	4 Systems 64 Months	None	2 Systems 34 Months	6 Systems 116 Months	7 Systems 77 Months	3 Systems 21 Months
1980 thru 1984	None	None	1 System 12 Months	3 Systems 81 Months	1 System 18 Months	None
Totals	12 Systems 138 Months	1 System 11 Months	3 Systems 46 Months	9 Systems 197 Months	13 Systems 184 Months	5 Systems 26 Months

This viewgraph shows where schedule slips have occurred. There are three basic reasons: technical problems, funding problems, and various other causes. Sometimes there are political reasons. The MX, for example, would fall into that category, as would some of the artillery shells. But you will note that in terms of technical problems, out of some 26 systems over the last 20 years, there has been precisely one that had a schedule slip as a result of technical problems in the DOE, although there were 12 which had slips of one sort or another because of technical problems with the associated DOD system.

I am not trying to knock the DOD. All I am saying is that if I were asking who is doing a good job and who ought to run who, I wouldn't say you ought to put the DOE laboratories under the DOD. The same can be seen here for funding problems, and so forth.

NUCLEAR WEAPON PRODUCTION COSTS

The question has arisen several times as to whether nuclear weapons are too costly. Well, costly compared to what? I have made a comparison I would like to show you.



REPEATER

Is a nuclear weapon costly compared to a piece of apparatus done in the private sector, which is of comparable reliability. I only know of one other piece of apparatus that is as complex as a nuclear weapon, almost, but not quite, and which has to be very reliable. That is a submarine-cable repeater, the telephone repeaters that go at the bottom of the sea and carry telephone calls across the ocean. Those things must last for 20 years without being touched because it costs an immense amount of money to go out and pull one up or try to fix it under the ocean. So AT&T and Bell labs spend immense amounts of care in trying to make that apparatus very reliable.

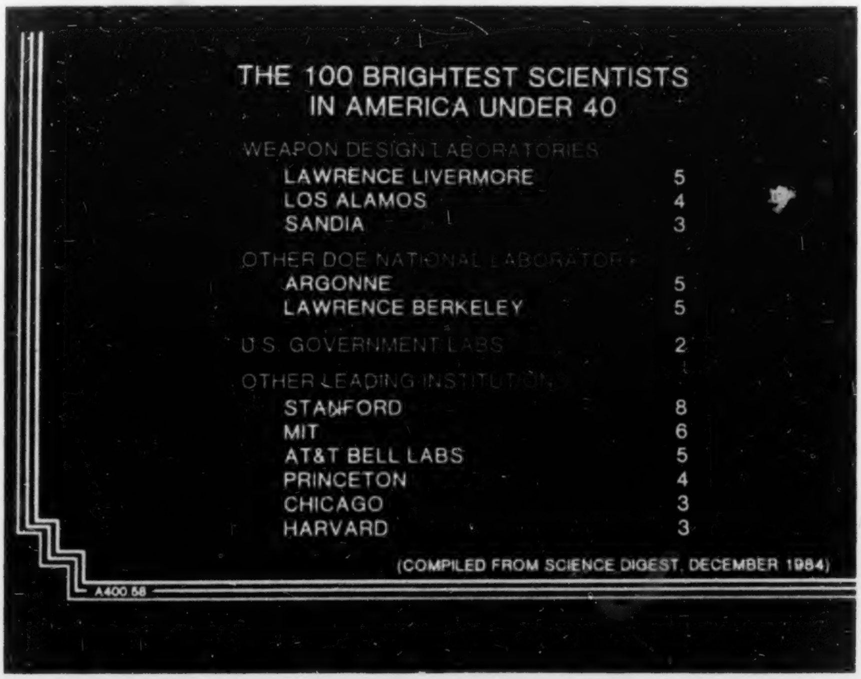
That is the SL repeater. It is comparable to a DOE product, [deleted] in terms of the number of components and general complexity, in my judgment.

[Slide deleted.]

It is also comparable, though not really identical, in terms of reliability. The [deleted] must be very much more reliable than a submarine repeater. If a submarine repeater goes bad you may waste a million dollars fixing it. If a [deleted] blows up by mistake, I think the consequences are too horrible to contemplate, both in terms of human life and in terms of political consequence. The submarine cable repeater is sold by Western Electric for $750,000. [Deleted.] I submit that we are not a high-cost producer. The weapons complex, including the factories, has a remarkable record of performance, including manufacturing. In fact, it is the total spectrum from research through manufacture which makes the nuclear weapons laboratories so valuable to this country. They are, in fact, unique. No other Government laboratory has responsibility for manufacturing a product and assuring that it actually works. That implies a certain discipline in the laboratories which I think is hard to find anywhere else.

THE FUTURE: AMERICA'S BRIGHTEST YOUNG SCIENTISTS

Finally, what about the future? Mrs. Byron asked several times about whether we are hiring good people.



THE 100 BRIGHTEST SCIENTISTS
IN AMERICA UNDER 40

WEAPON DESIGN LABORATORIES	
LAWRENCE LIVERMORE	5
LOS ALAMOS	4
SANDIA	3
OTHER DOE NATIONAL LABORATORIES	
ARGONNE	5
LAWRENCE BERKELEY	5
U.S. GOVERNMENT LABS	2
OTHER LEADING INSTITUTIONS	
STANFORD	8
MIT	6
AT&T BELL LABS	5
PRINCETON	4
CHICAGO	3
HARVARD	3

(COMPILED FROM SCIENCE DIGEST, DECEMBER 1984)

This last viewgraph speaks to that point. Science Digest, in December of last year, rated the hundred brightest young (under 40) scientists in America and listed where they were. Well, now, look where they are. Five at Lawrence, four at Los Alamos, three at Sandia, five at Argonne, and five at Lawrence Berkeley. In all the rest of government there are only two. Those are at the National Center for Atmospheric Research and the Atlanta Center for Infectious Diseases. There are none in DOD.

If you look at other leading institutions, you will see Stanford, MIT, AT&T, Princeton, Chicago, Harvard. I am proud to say that AT&T is a leading place, as well. But my point is that these are precious resources. These are the brightest young people we have in this country, and they are in the national laboratories.

Mrs. Byron. Mr. Chairman, could I?

Mr. Stratton. Yes.

Mrs. Byron. My point that I was making was not only where the brightest young scientists are, but the fact that we are now bringing these bright young scientists into Government laboratories. And if we cut their programs at a crucial time, we are not going to be able to recruit the ones that I am looking coming down the road in 10 or 15 years. That concerns me.

Dr. DACEY. That concerns me too, Mrs. Byron. I think we must, in fact, provide the environment for these bright young people to remain coupled to national imperatives so they will do their thing for the country instead of for themselves or some other purpose. Clearly, one element of that is to provide them with challenging work, which I think we have managed to do over the years. That implies many things. It implies not stopping and starting programs. It implies that we do not prevent testing or any other thing which interferes with their ability to do their work for the world. And, importantly, it implies, that we should manage these people by other scientists; by people who know how to deal with other scientists and who know how to deal with scientific programs. The thing that concerns me so, and the thought I want to leave with you, is that unfortunately did not prevail when we broke up the Bell System. The thought is: it ain't broke, don't fix it. We have a very excellent national laboratory system in this country. It is unique. It is managed now by professionals, by the University of California, by AT&T, Bell Laboratories. If we tinker with the way it is managed, if we change that system, I think we risk driving away the very excellent capabilities that we now have.

And so I speak to you particularly as one of the few bodies who understands, who has been around, who does know why the system works, the way it works. And when these Blue Ribbon reports come to the Congress with whatever proposals they may make, I hope you will recognize that you have a national duty as stewards of our most precious technical resources in the national labs of the Department of Energy.

Thank you, Mr. Chairman.

Mr. STRATTON. Thank you very much, Mr. Dacey. I take it that what you are saying, at least tangentially, is that the idea that has been proposed that the Department of Energy be consolidated into the Department of the Interior, or perhaps just abolished, as was proposed some three or four years ago, is one of the points that you are making, that we have got a good operation going.

It would be intellectually, and perhaps defensewise, absolutely foolish to damage it and to destroy it.

Dr. DACEY. I am certainly saying that it would be foolish to damage and destroy it by moving in a direction which at least in my judgment would make the laboratories less effective. I haven't seen a proposal for moving the weapons system into the Department of Interior in any kind of detail that I could comment on.

Mr. STRATTON. I think the whole idea of abolishing the Department of Energy, which surfaced some 4 years ago and now apparently has come up again, would mean that either these operations would be placed in the Department of Defense, or else they would be in some ragtag agency that would have very little clout at the White House, and would be obviously extremely difficult, would find it extremely difficult to attract the kind of individuals that you and Mrs. Byron have been referring to.

Dr. DACEY. Yes, I believe——

Mr. STRATTON. I wondered whether you could comment on that, whether you could elaborate on that a little bit for us, because I, myself, have been concerned about this. I was shocked when the first proposal was made back in the previous administration, in the previous term of this administration. And surprisingly, the thing that killed it was the fact that those of us, those few of us who support nuclear weapons and who support the job that you are doing also found that those who opposed nuclear weapons, which in the Congress I think are probably a majority, joined together in opposing the President's proposal, and that was why it was washed out.

But I hope that we don't have to go through this kind of thing again. I think what you have said would indicate that if it were to be consolidated with the Interior Department, which has certainly very little bearing on what the national laboratories are doing, we would end up, I think, not only wondering whether we were behind the Russians, but knowing that we were very significantly behind them.

Dr. DACEY. Well, I would certainly agree that anything which dilutes the management attention to our defense programs would be a bad thing to do.

I wouldn't want you to think, however, that I am emphasizing only the Department of Energy in terms of where the nuclear defense programs might be located. I am concerned about a number of things. That is one. Another is a concern as to whether or not the laboratories should be managed from Washington rather than by local technical management. This brings up the whole question of micro management. I am concerned about a Blue Ribbon Task Force which was set up in response to Senator Nunn and Senator Warner, who would like to put funding for the Department of Energy weapon laboratories into the Department of Defense. There are a whole series of criticisms in which people are concerned about the orthodoxy of process instead of result, where they are trying to say: "I like what you did but I don't like the way you do it." They say: "I would like to help you by making you do it this other way, instead of the way that has worked for the last 40 years."

So my concern is that it is coming at us from a number of directions. Not just Interior, not just micro management, not just Nunn-Warner, not just the Inspector General of the Department of Energy, but from all of these directions at once.

I think that most of these people do not understand the value of the merchandise with which they are tinkering.

Mr. STRATTON. Well, I think that is a very, very valuable statement and I certainly appreciate your making it.

Any questions? Mr. Mavroules.

Mr. MAVROULES. Mr. Chairman, I just wanted to make a little statement. And I want to congratulate you, Dr. Dacey. If you feel that strongly about it, I would request that you continue to speak out on this, because——

Dr. DACEY. You can count on it.

Mr. MAVROULES. Pardon?

Dr. DACEY. I say you can count on that.

Mr. MAVROULES. I know that. Even though you might be retiring, we can certainly use your very helpful testimony. In your judgment, you said you have been around for about, what, 30 years in the technical field?

Dr. DACEY. Well, closer to 40.

Mr. MAVROULES. Forty years.

As I stated this morning, I do have some differences with the nuclear field, period. However, that doesn't deter from my thinking of the great job you are doing and quality of people we have. I just want you to know that. If you were to make a comparison of the scientists we now have and those coming out of school, as Mrs. Byron stated, maybe 10 or 15 years down the road, do you have any idea, can you compare the quality of person we have knowledgeably versus that person in the Soviet Union or Warsaw Pact nations? Do you have any inner feeling about that, Doctor?

Dr. DACEY. Yes. There are a number of differences. Not in brain power certainly. The Russian population turns out geniuses just as ours does. I think there are differences in the way in which a typical Russian scientist thinks and the way a typical American scientist thinks. Russians tend to be much more theoretical rather than experimental. And in fact when you look at certain branches of mathematics, certain branches of deep, theoretical study, I think that the Russians lead the world. On the other hand, where I think we lead them by an enormous margin is what you might call the broad infrastructure of our technical society. You can, if you are a high school kid, go down to Radio Shack and buy a microprocessor chip and do some sort of experiment in your basement. The broad availability of technical equipment broadly to the whole population in Russia is very much less, of course, than it is here. The elite, the group of people who are doing the things that the Russians want them to do, get all the support they could possibly need. But it's very specialized support. If you want a screw, you have a machinist who makes you a screw and you put it in a nuclear weapon. There isn't the same broad availability to the private sector, which is, I think, one of the great strengths of our country.

Here we have not just our national laboratories, we have Bell Laboratories and IBM, hundreds of universities, all of whom have totally free ability to express technical ideas among themselves. In Russia the situation is very much more centrally controlled, very much more structured. And I think that in that situation the best people work on what they are told to work on. But whether they work on it with the same creativity and spirit as our people do, I would doubt.

Mr. MAVROULES. May I follow up, Mr. Chairman?

Mr. STRATTON. Sure.

Mr. MAVROULES. If you could. And, again, I am looking for direction from you. I think you have given me a pretty good answer, but let me be a little more direct. Do you think we have a qualitative edge in our nuclear field versus the Soviet Union? If you do not, do you feel we can achieve it?

Dr. DACEY. It depends. I would say in certain parts of the nuclear field I think we have an edge. In certain other parts I think we are behind.

The parts where I think we are ahead are where electronics, sophistication, accuracy and concern about command and control and safety are involved. I think that the Russians are less worried about those things than we are and less capable in terms of microprocessors and sophisticated electronics to put into weapons than we are. The result of all that, I think, is that the actual weapon itself is probably less sophisticated than ours.

On the other hand, I think there are certain others areas where the Russians may be very well ahead of us. The Russians, after all, do not have congressional debates about whether or not a program shall continue with full support, on and on and on. And they tend to never give up. They tend to have a program that goes on and on and on, and they add and they add and they add, and it may be kind of a tortoise and hare situation. [Deleted.]

If you look at certain elements of their forward-looking work, they seem to have led us in a number of areas. Sandia, as you probably know, is the leading American institution in pulsed power, the ability to control immense amounts of electrical power in short periods of time and in short spaces in very much of that technology we were preceded by the Russian literature. Very high-speed, very high-current switching, for example, was an area that they were in very early. [Deleted.] So in certain areas, they may very well be ahead of us. If you talk about the broad field of technology generally, I think we are ahead of them.

Mr. MAVROULES. I thank you very much. Thank you, Mr. Chairman.

Mr. STRATTON. Anybody else?

Mrs. BYRON. I have a question that follows along with the one I asked Dr. Batzel this morning, on funding. The PBFA-II is not yet financed or operational, and yet we are talking about once again cutting funds out of that program, what effect do you see that having on the overall ICF Program?

Dr. DACEY. Well, I guess my answer has to be similar to Dr. Batzel's answer. We will find some way of keeping that program alive because I think it is very important for this country. The Pulsed Power Program has three elements to it and we will have to balance between those various elements. One element, as you know, is the use of immense amounts of power in a small space to simulate the effect of nuclear weapons. The reason the nuclear weapon is different, among other things, is because it has lots of energy in a very small space. We can't test that conventionally on anything like the scale of a nuclear weapon. But if you take a very small area and put a lot of electrical power in it, you can simulate in that tiny space, looking at the effects on radiation-hardened electronics, for example, the effects of a nuclear weapon without having to have an underground test. That saves a lot of money. We are building the simulation laboratory for that purpose.

Another element is to use that very highly concentrated electrical energy as an alternative to lasers, to try to make fusion in a very small spot. That, of course, has all the same weapon spinoffs Dr. Batzel mentioned.

A third area, a very new one, is the use of these very high pulses of electrical energy to simulate the effects of a laser, to look at beam-type weapons, where we are the ones who know how to get the electricity in there to make the thing run. So there are three prongs to this high-power program, only one of which is ICF.

What I think we will be forced to do is to postpone the date at which we expect to finally get a fusion reaction going in the ICF Program. We will have to work on other elements of the program.

Mrs. **Byron**. We just finished last year fully funding the program. Now, the enormous amount of discussion, dialogue, that is going on up here on SDI, and so what we are talking about is moving ahead rapidly in one segment of SDI and funding it. Yet, in your segment of it we are talking about cutting the funding back to a trickle. It seems to me that the one hand doesn't know what the other one seems to be doing. Would that be a correct assessment?

Dr. **Dacey**. I would hate to comment on prestidigitations, as I think you are asking. But I will say this. If we had complete freedom to configure the funds in any way that we thought was optimum from a purely technical standpoint, we would certainly not cut back on ICF.

Mrs. **Byron**. The PBFA is extremely important to SDI. How about to the weapons program?

Dr. **Dacey**. Yes, I think it is especially important to the weapons program and even more so, I believe, in the area of SDI. Because one of the things we often don't talk about is the countermeasures that the Russians could use if, in fact, we were to produce a defensive system.

Before the defensive system that we finally put up can be said to be robust, we must know whether or not there are effective countermeasures, and we will use these facilities to study what the Russians could do to defeat SDI. Therefore, I think it's a very important thing, not against SDI weapons themselves but against nuclear weapons. So we are trying to see whether or not the nuclear weapons can be protected against SDI-like attack. It takes these facilities to do that.

Mrs. **Byron**. I have no further questions. But I think it is something we really ought to look at very carefully.

Dr. **Dacey**. Thank you.

Mr. **Stratton**. Doctor, I have got a couple of more questions here that I would like to ask you. It has been some time since this subcommittee was considering these matters and there are so many different aspects and combinations of letters and so on that we lose sometimes our expertise. I would like specifically to ask, because you have reminded me with your previous remarks, first of all, the Nunn-Warner amendment is designed to determine whether the money spent on nuclear weapons should be included in the defense budget rather than the nuclear budget; is that correct? Because we don't have too much to do with those people on the other side of the Capitol, so that we are not always fully apprised on what their comments and suggestions are. I remember when I first heard it, I felt it was something that was going to give us a lot of trouble.

Dr. **Dacey**. As you recall, Mr. Chairman, during the course of the debate which surrounded the original amendment—which was, exactly as you indicated, intended to put the budget moneys for the DOE weapons program into the DOD budget—it was determined that a Blue Ribbon Task Force investigation of this issue should be the purpose of the amendment rather than a law to make it happen. So, as a result, a task force is being assembled at somewhat similar speed to the previous one that was discussed today to come to grips with this issue. We expect the Blue Ribbon Task Force to be in place within the next few weeks. They will study the matter.

We will see whether there are better ways of trading off moneys and concerns between the DOD and DOE. What will emerge from these studies it's hard to say. This is the latest of a long series of task forces. The Starbird Committee and several others have addressed the same issue over the years, and where this particular blue ribbon committee will come out is hard to say. But it is that, among other things, which causes the concern which I tried to express in the course of my testimony.

Mr. STRATTON. Has there been any designation of a chairman?

Dr. DACEY. I heard it mentioned—whether he has finally accepted it or not I cannot tell you—Judge Clark.

Mr. STRATTON. Does Judge Clark have any particular expertise in nuclear matters?

Dr. DACEY. I don't know, Mr. Chairman.

Mr. STRATTON. I am concerned about this, as I am sure you are and have indicated; my own feeling was that one of the major decisions that had been made very early in the nuclear age was that the nuclear program should not be included in the Department of Defense, which would be set up separately. It seems to me that that the Nunn-Warner operation, or the Blue Ribbon Task Force that is to follow it, is going in really the wrong direction. And what is likely to happen is that, since those sums are going to be added to the defense budget and therefore swell the defense budget, it will make it easier for those who don't like to vote for defense to vote against it. And that is going to jeopardize very seriously, it would seem to me, our nuclear deterrent. So I appreciate your reminding me of what these are likely to do, and we will try to keep an eye on them.

Thank you very much, Doctor.

[The following question was submitted for the record:]

Mrs. LLOYD. Dr. Dacey, where is the largest program growth at your laboratory? Is it in areas where you have a strong capability?

Dr. DACEY. We anticipate that FY 1986 expenditures at Sandia National Laboratories in support of the Strategic Defense Initiative will be at [deleted] level. This is a [deleted] from the FY 1985 level of Sandia has a unique capability in pulsed power which was originally developed to simulate nuclear weapons effects. It later found application in our Inertial Confinement Fusion program. [Deleted.] In addition, Sandia also has a strong capability in the systems engineering aspects of nuclear weapons. This capability is being used to establish a technology base for the future development of concepts and subsystems necessary for nuclear directed energy weapons. Related Strategic Defense Initiative activities at Sandia National Laboratories, with some funding support from Department of Defense, emphasize the discrimination, countermeasures, and vulnerability side of the program. In addition, we see a heavy commitment to the Phase 3 weapon workload in FY 1986.

STATEMENT OF DONALD M. KERR, JR., DIRECTOR, LOS ALAMOS NATIONAL LABORATORY

Mr. STRATTON. Our next witness is Dr. Donald Kerr, who is the director of the Los Alamos National Laboratory.

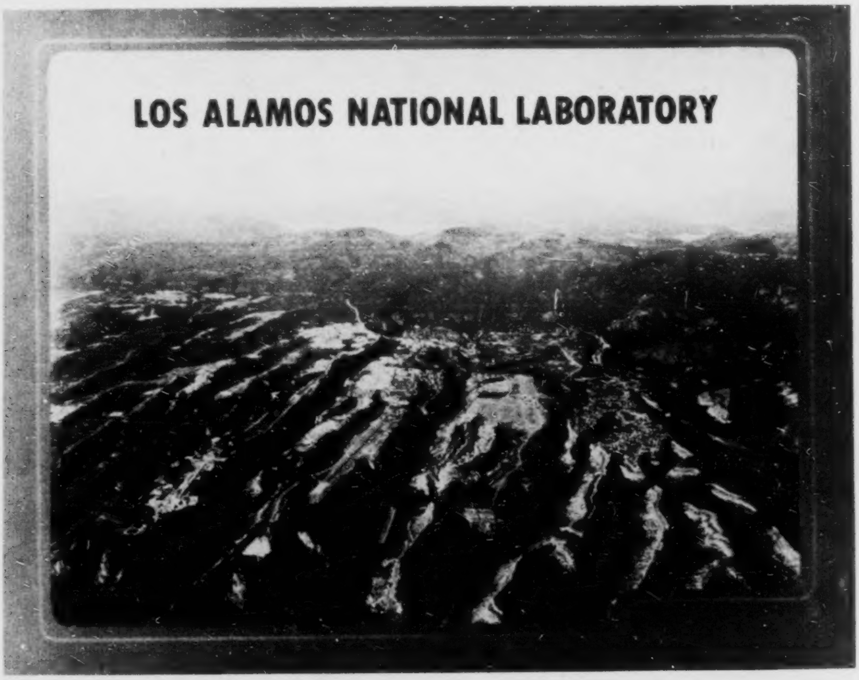
We are getting all of the laboratories' directors here, but I know that at some point along the line that if they haven't entirely abolished the laboratories, we will try to get the members of the committee, and particularly the new members of the committee, to take an opportunity to meet with you gentlemen in your native milieu, and we welcome you back, Dr. Kerr, and appreciate your testimony.

Dr. **Kerr**. Thank you very much, Mr. Chairman, and members of the committee.

I would hasten to say that both old members and new members are welcome to visit New Mexico at any time they might choose.

With your permission, I would like to stand and use charts to support my discussion with you.

Mr. **Stratton**. Be our guest



LOS ALAMOS NATIONAL LABORATORY

INTRODUCTION

Dr. **Kerr**. To give reality to the invitation, Los Alamos was wisely placed in New Mexico, atop these mesas, some 42 years ago where today there are about 7,500 people and a major emphasis continues to be in defense programs. Roughly 75 percent of our work today is involved with national security activities. The largest part of that, the nuclear weapons program, we are discussing with you today.

Mr. **Stratton**. Is that the airport right in the middle there?

Dr. **Kerr**. Yes, sir.

The setting, of course, is spectacular. This is one of the main laboratory's sites. There are technical sites that are scattered over approximately 43 square miles at Los Alamos.

There are three major elements of our DOE defense programs. One has to do with the modernization of our strategic and tactical nuclear forces. The second is the strategic defense research, and the third is the area of arms control and verification technology. While not part of the direct DOE-supported work, the work we do directly for the Department of Defense is also an important component of our national security programs.

I will touch on one of those items repeatedly as I go along with respect to the longest standing first-priority mission, the support to the modernization program of our strategic and theater nuclear forces, the thing we are most involved with.

STRATEGIC AND TACTICAL MODERNIZATION

During the first 5 years of this decade, we have been responsible for the Minuteman III, Mark 12A warhead; the Trident I; and the air-launched and submarine-launched cruise missile warhead. Our present responsibilities include the W88 Trident II warhead—discussed with you yesterday a bit by the Navy representative—another Navy weapon—the ASW standoff device—the standard missile; the continuing modernization of the B61 bomb; and a warhead for the advanced cruise missile.

It is important to note that the Trident II warhead will provide now [deleted] at a net cost saving, we believe, of something like $600 million in production without any serious effect in terms of diminished military capability.

With respect to the standoff——

Mr. STRATTON. This is the D-5?

Dr. KERR. Yes, sir.

Mr. STRATTON. And is that a different warhead from the C-4?

Dr. KERR. The C-4 warhead is what we call the W76. [Deleted.] It seems to perform very well but, more importantly from a production point of view, it seems to be relatively insensitive to tolerances in production and hence may be producable at a lower cost than some of the other kinds of designs we are now working on.

VALUE OF COMPUTERS

With respect to another important characteristic of weapon design laboratories, Los Alamos and Livermore have the largest scientific computing capabilities in this country, and in fact the world. You have provided the resources for those facilities to exist, and I thought it might be useful to you to understand what they mean to us in terms of making a difference in our ability to conduct the weapons program.

What we did was take the warhead primary design for the air-launched cruise missile and redesigned it using more modern techniques than we had at hand when the W80 was first worked on. It was first done back in 1977. Now we are able to use things like the new Cray I machines, the XMP's, and the like.

We constrained the problem to try and come up with a convincing demonstration of the more powerful techniques in weapons design. [Deleted.]

We used state of the art in computing in terms of 4 million word memory, interactive graphics, a large network and certain artificial intelligence techniques in the computer logic.

Most important is the result. [deleted.]

We think it demonstrates where that development in new design capability can pay off for the future.

We are also now trying to take those new and more powerful methods and examine things that were done in the past. You may recall that a modern weapon looks like two basketballs side by side; what we call the primary, and what we call the secondary or thermonuclear components.

Another point that is also very important in today's weapon program climate is a reference you made this morning concerning a comprehensive test ban or test restraints like the threshold test ban that is in effect now, even though not ratified.

So it is a technical exploration not tested yet in Nevada, but at least it represents an approach to use these new improved capabilities within today's arms control climate.

Mr. STRATTON. That won't violate Mr. Mavroules' legislation?

Mr. MAVROULES. I like what I am hearing. Continue please.

Dr. KERR. I was going to leave that subject now, sir.

Mr. MAVROULES. I think you are doing a good job.

Dr. MANSFIELD. Mr. Mavroules, you couldn't do that only within the threshold test ban.

Mr. MAVROULES. I realize that.

Dr. KERR. I should go and restate that.

Mr. MAVROULES. You want to remember that all legislation that is filed can be worked upon. I think you realize that also.

Dr. KERR. What we are trying to look at, the fundamental technical question is: Are there present treaty compliant ways in which we could develop higher yield systems without violating the Threshold Test Ban Treaty restraint? But we didn't say we could do it without testing; in fact, that won't be the case at all.

Mr. MAVROULES. I understand.

Dr. KERR. I am going to turn now to——

Mr. STRATTON. The TTBT can be total test ban treaty or it can be threshold test ban treaty, right?

Dr. KERR. Yes, sir, but in this context it is threshold test ban treaty.

STRATEGIC DEFENSE

I would like to turn now to the strategic defense research we are carrying out. I will begin by talking about two of the nonnuclear programs that we are concerned with. These are supported directly by the Department of Defense, but the reason I want to bring them up with you is both to inform you and point out how the Department of Energy technology base and the weapons program have, in fact, provided the wherewithal to conduct the program.

[Deleted.]

But it does give you an indication of the relationship between what appears to be a nonnuclear strategic defense idea and the nuclear technology that underlies it. It allows one to comprehend what it might do.

In a similar manner, another Department of Defense-supported program is that of the free electron laser, which again builds on that accelerator technology but also brings into play all of the laser technology that was developed in the ICF program and special isotope separation program.

What we have been able to do at this point in time is demonstrate a 7-kilowatt output laser where the optical energy is derived from a beam of accelerated electrons. It is the highest power reported in the world to date.

We have also been able to tune it by a factor of 4, from 9 microns to 35, and we are working on structures to make shorter wavelength capability. It has used existing facilities, some of them part of the ICF program surrounding the Helios, and Antares Lasers.

We are hoping for a 1-megawatt demonstration in fiscal year 1988, provided work proceeds as it has, and it is ultimately expected to do a demonstration at the 10-megawatt level at White Sands Missile Range in the early 1990's. So, again, we built on these weapons capabilities in order to address another important area of technology.

Mr. STRATTON. Does that supercede the gas laser that you had?

Dr. KERR. No, sir, in fact, I couldn't have asked for a better question.

One of the things that we are doing with the Antares facility, which is the latest and largest gas laser, is in fact to use it as part of our studies of vulnerability and lethality. Dr. Dacey just mentioned that in the context of a pulsed power facility.

Similarly, we are using the largest gas laser facility to study the problems of optical damage to sensors, damage to reentry bodies and structures, that might be our problem if the Soviets were to field some of the ideas that the United States has been talking about. [Deleted.]

And, once again, that combination of advanced theoretical design and excellent diagnostics gave us real understanding. The techniques we have used for diagnostics and for the laboratory studies have been those of the ICF program.

Mr. STRATTON. And if the ICF budget figure that the administration has offered is sustained, then that would damage or slow down your experiments, is that correct?

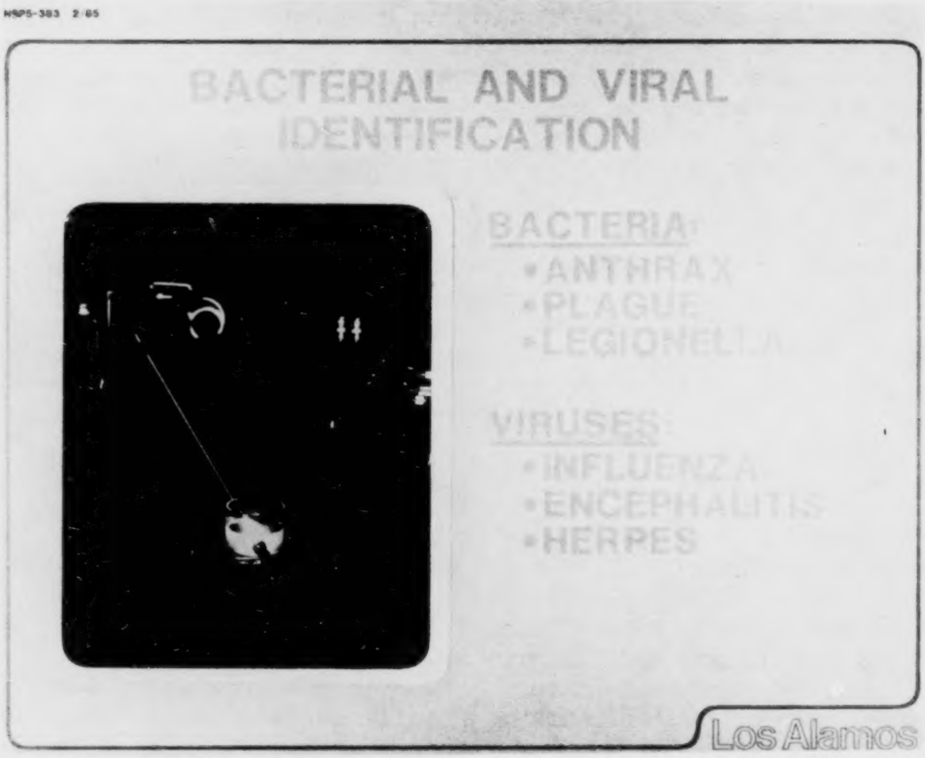
Dr. KERR. It would have roughly 45 percent less capability to do these things than we have today.

Let me turn to the area of what can you do in arms control and verification. We have talked with you before about our joint endeavors with Sandia in satellites that today are followed on by our payloads on the global positioning system that will detect nuclear explosions in the atmosphere or in space. That is continuing. There are four satellites up and functioning at the present time.

ARMS CONTROL AND VERIFICATION

A second endeavor was referred to by the President when he spoke to the U.N. General Assembly last year and suggested that the Soviet Union join the United States in seeking better verification technology [deleted].

An area that has both medical [deleted] implications is some work we have been doing in identifying bacteria and in viruses.



NSPS-383 2/85

BACTERIAL AND VIRAL IDENTIFICATION

BACTERIA:
- ANTHRAX
- PLAGUE
- LEGIONELLA

VIRUSES:
- INFLUENZA
- ENCEPHALITIS
- HERPES

Los Alamos

We are supported for this by the U.S. Army and have been using light scattering techniques from lasers scattering on a sample containing bacteria or viruses. We have been working with an anthrax plague and Legionnaires disease in terms of bacteria. We started with influenza, with live virus provided by the Center for Disease Control, and have moved on to syphilis and even to herpes at this point.

Mr. STRATTON. How about AIDS?

Dr. KERR. No, we have not gone that far yet.

[Deleted.]

Finally, in terms of the value of bacterial identification work to our society, patents have, in fact, now been made available to a new start-up company in New Mexico which is going to try to develop a medical instrument for the private sector market. It is a real case where a defense-supported technology has near-term and I think quite remarkable potential for the private sector.

Mr. STRATTON. What you are doing is making a picture.

Dr. KERR. No, you shine the laser light and vary its color or wavelength and look at scattering from this solution as a function of wavelength and each of these different plagues, if you will, has a characteristic signature.

SPECIAL ISOTOPE SEPARATION

We talked earlier about special isotope separation. We are well along in terms of our demonstration of what we call SIS II; we demonstrated the highest separation factor of any process. We developed some new plutonium processing techniques to replace the processing techniques that have been used in the past, Allied Technical has succeeded in building the laser for our SIS III test facility which performs at a factor of two beyond the specification we gave them, [deleted].

FISCAL YEAR 1986 FUNDING

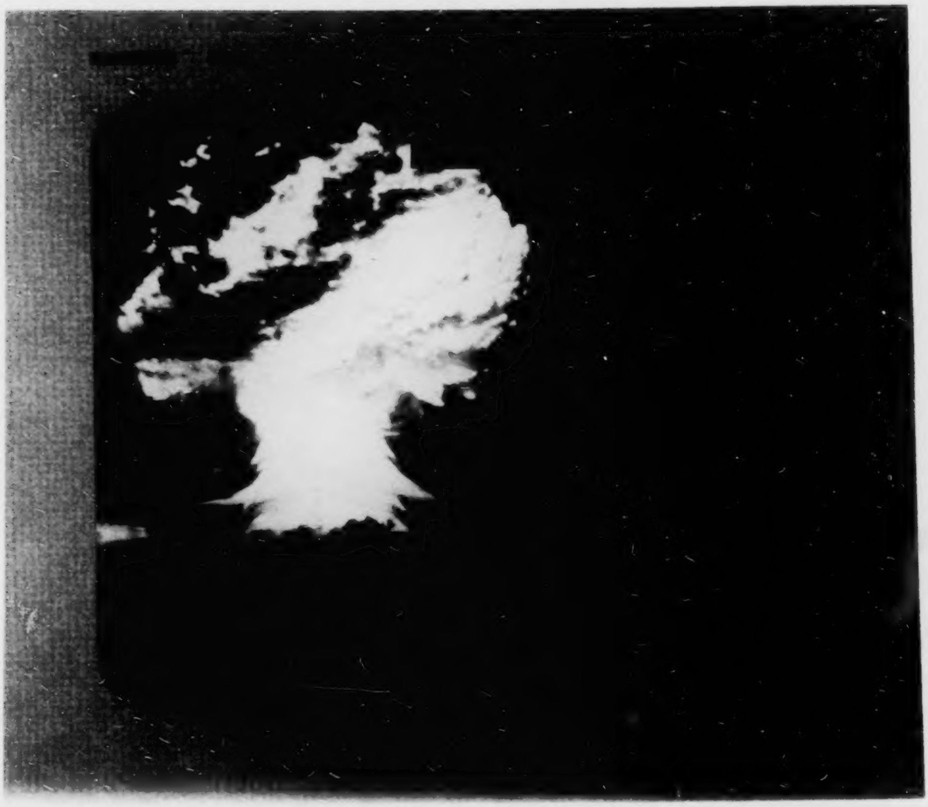
I will get to the fundamental point that you have been raising. This is our view of the weapons program funding for the laboratory in constant fiscal year 1986 dollars. It breaks out into four categories that we report our activities to the DOE in: test, special projects, development engineering and certification, which goes with those weapons systems being worked on for the stockpile, and the technology base.

When you ask the question of where does strategic defense fit in, it is this hatched area. I should point out to you, by the way, that it was hatched even as far back as this chart shows in 1980, but in fact the laboratories have been working on ideas for strategic defense for the last 25 years.

It has increased somewhat but to increase more within this same funding envelope would be very difficult without diminishing some other very important activities wither in the engineering development tests or the technology base that supports them.

This chart does include the proposed increase of $21.8 million in weapons research and development. I think you see that it basically will about hold us level, but then we will be without that other 45 percent of the ICF program.

So I think it rather directly addresses the points you have been raising.

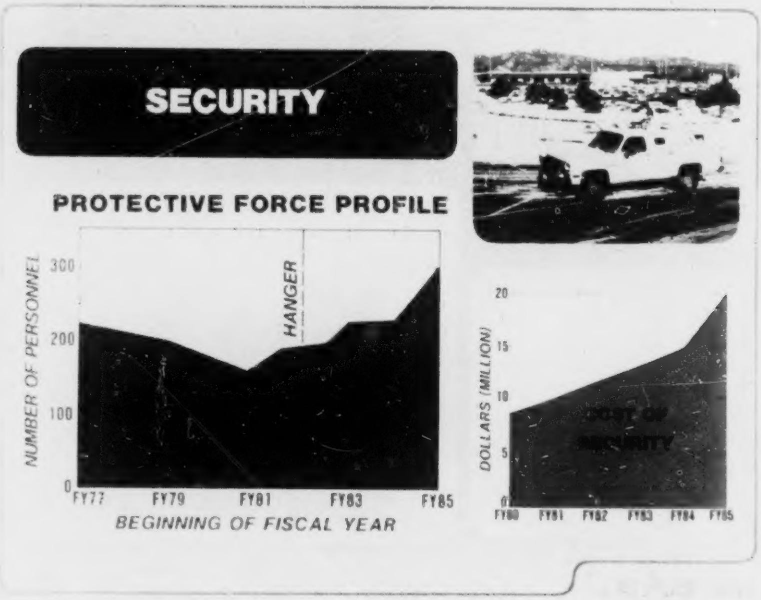


Radiation litigation came up as well earlier. I wanted to make an improper statement but I shouldn't tell you whether legislation is proper or not, only that it certainly was a relief. There were 80 lawsuits involving some 9,000 plaintiffs, but important to note is that each of the three weapons laboratories has been spending $2.5 million a year from program funds in order to pay the lawyers who are defending either Sandia, AT&T, the University of California, or Livermore and Los Alamos.

We have been asked to continue that support because, even though the legislation provides for the claims to be made against the Government rather than the contractors, our services will still be required to support the Government's preparation of its own case.

SAFEGUARDS AND SECURITY

Last year you asked me how old the security guards were. It may have something to do with a visit at one time. Let me show the present status. We have now built up to the full 300 armed guards that were expected to be appropriate for securing the Los Alamos site. That followed our finally being given permission to go out and subcontract for the guard service rather than having them be Federal employees, which is this period of long decline in which we had to fill in with our employees at one time.



SECURITY

PROTECTIVE FORCE PROFILE

You also ought to be aware that the cost of security goes with these increases in manpower, particularly because some of the other upgrades were paid for by capital funds rather than operating funds. We expect it will cost something like $20 million. It is an overhead cost, so it is budgeted for, but it isn't overtly dealt with in terms of appropriations and authorization. It is an overhead on the program, and that is what it costs.

This is something we are very proud of. It is our design you may have seen in other locations, including ours—the armored car-like or tank-like vehicles, camouflaged painted. We have developed a vehicle that is cheaper, and we think better, than the tank-like vehicles with camflouged paint. It is based on a Chevy Carryall design with a hydraulic machine gun mount that comes in and out of the roof. We think it is a far better thing wandering around the streets of communities like Los Alamos and Oak Ridge than some of the others; yet it is as effective; more importantly, it is cheaper by $30,000 a copy.

Mrs. HOLT. May I ask a question?

Mr. STRATTON. Yes.

Mrs. HOLT. Do you still deal with the same contractor that you originally started out with for security, a Texas company?

Dr. KERR. That is right, it is the Mason-Hangar Co. They are also the operating contractor for DOE at the Pantex plant. They are in the third year of that 3-year contract.

Mrs. HOLT. That is the original contract?

Dr. KERR. Yes.

Mrs. HOLT. Have the prices gone up, the salaries?

Dr. KERR. They have done a relatively good job of controlling it. We have, in effect, held down escalation in those costs and made their salary increases track about those of the Zia company, which is our plant and construction contractor and some of our lab people, as well. So we have not let that escape control.

Mrs. HOLT. Have you had any problems with them at all?

Dr. KERR. It would be wrong to say we have had no problems. The better question for me to answer is, are we satisfied with their performance and has it improved?

Mrs. HOLT. That is what I want to know, what are the disadvantages of this? I was opposed to it initially. I want you to prove to me that it has worked.

Dr. KERR. I guess the best way to say it is that in terms of morale, condition, and training, they are superior to the Federal force at any time in its history, save the period in the Second World War when there were troops in uniform.

Mrs. HOLT. Sounds pretty good.

Dr. KERR. They are really dedicated people.

Mrs. HOLT. They don't do anything wrong?

Dr. KERR. We don't believe the contractor relationship is deterimental to the performance of their duties.

Mrs. HOLT. They don't do anything wrong then?

Dr. KERR. I didn't say that.

Mrs. HOLT. What is wrong with it, my question, what are the disadvantages of it? What have you found?

Dr. KERR. We haven't found any disadvantages that relate to it being a contractor rather than a Federal force. We do on occasion have disciplinary problems, we have people who have been terminated for cause, we have had petty theft. But you have that within any group of people, and that is independent of whether it is the contractor relationship or the Federal employees.

Mrs. HOLT. You haven't had more?

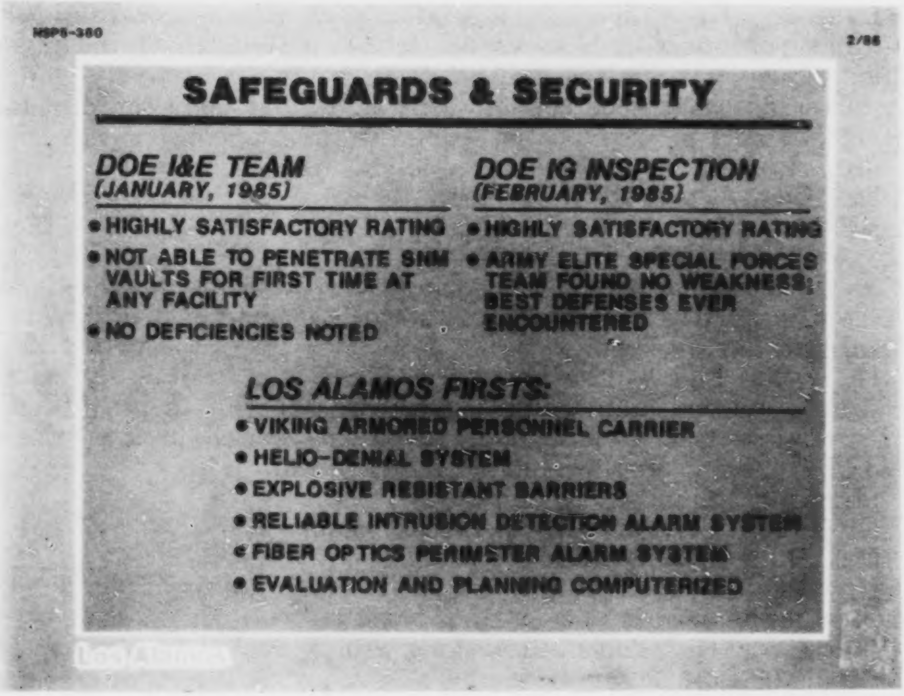
Dr. KERR. To some degree, less.

Mrs. HOLT. They are unionized, aren't they?

Dr. KERR. They are unionized, but the union is very ineffective, as a matter of fact. The union I think is, you might call it stillborn. It hasn't been able to negotiate effectively on behalf of the membership. The members don't recognize it as their agent at this point, so we haven't had the full force of a union.

Mrs. HOLT. I am glad you proved me wrong, then.

Dr. KERR. I am glad I could answer the question the way I did today.



SAFEGUARDS & SECURITY

DOE I&E TEAM
(JANUARY, 1985)

- HIGHLY SATISFACTORY RATING
- NOT ABLE TO PENETRATE SNM VAULTS FOR FIRST TIME AT ANY FACILITY
- NO DEFICIENCIES NOTED

DOE IG INSPECTION
(FEBRUARY, 1985)

- HIGHLY SATISFACTORY RATING
- ARMY ELITE SPECIAL FORCES TEAM FOUND NO WEAKNESS; BEST DEFENSES EVER ENCOUNTERED

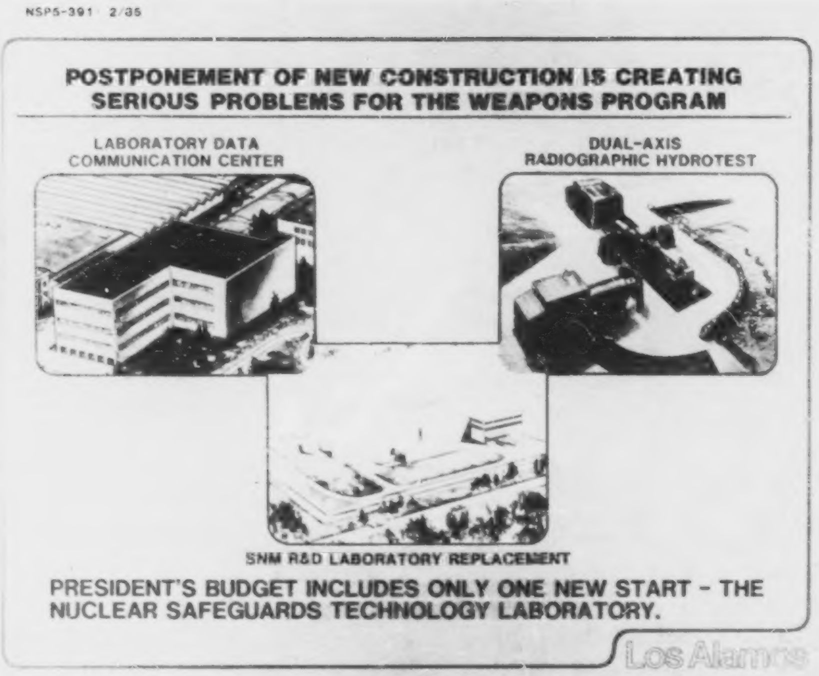
LOS ALAMOS FIRSTS:

- VIKING ARMORED PERSONNEL CARRIER
- HELIO-DENIAL SYSTEM
- EXPLOSIVE RESISTANT BARRIERS
- RELIABLE INTRUSION DETECTION ALARM SYSTEM
- FIBER OPTICS PERIMETER ALARM SYSTEM
- EVALUATION AND PLANNING COMPUTERIZED

To give you a summing up, other people have been paying a lot of attention to our security, but recently the Department of Energy checked in January and February of this year (the first within General Hoover's own operation). Their inspection and evaluation team, gave us a highly satisfactory rating. For the first time in terms of their force-on-force exercises at any site, they were unable to penetrate an SNM area, and there were no deficiencies noted.

The Department's Inspector General came and did the same thing in February, gave us a highly satisfactory rating, and members of the DELTA force, through the Army, were part of that inspection team, and they found no weaknesses. They said they saw the best defense they had encountered. We have a helicopter denial system in place, explosive resistance barriers, intrusion systems are now more reliable, and we have put together, I think, a very effective plan and risk assessment system.

So, we are ready to be judged on the results at this point.



NSP5-391 2/35

POSTPONEMENT OF NEW CONSTRUCTION IS CREATING SERIOUS PROBLEMS FOR THE WEAPONS PROGRAM

LABORATORY DATA COMMUNICATION CENTER

DUAL-AXIS RADIOGRAPHIC HYDROTEST

SNM R&D LABORATORY REPLACEMENT

PRESIDENT'S BUDGET INCLUDES ONLY ONE NEW START - THE NUCLEAR SAFEGUARDS TECHNOLOGY LABORATORY.

Los Alamos

To finish up, in the area of construction, we were elated when the Department of Energy budget, as it went to OMB, contained four facilities for the laboratory. We weren't as elated when the budget came back and only one had survived—the very important nuclear safeguards technology laboratory.

Three very important capabilities at our site were put off. One was the Laboratory Data Communications Center, which would be space to house computers, the people who work with them, and the equipment you need to communicate with them. Another is a replacement for a 35-year-old special nuclear material laboratory which is increasingly costly; in fact, General Withers showed a picture of it this morning with the roped-off areas in the basement where the plumbing failed and we have had spills and hence have to deny people access.

Last, a dual access radioactive facility. These sorts of things are very important to the laboratories. First comes people. We have had some excellent discussion particularly with George Dacey today that, when you have the world's best people or hopefully at least the country's best people, you also need the kind of facilities that allow them to really use their full capabilities. And then, of course, you have to have the challenging programs that cause them to be motivated.

So, this is a continuing problem, one partly addressed through revitalization, for example, but it is an important thing, I think, for me to note.

In closing, on the matter of facilities, there is a very important component of construction that ofttimes is not mentioned; that is what is called the General Plant Project [GPP] funding.

In a year particularly when there are very few if any new starts, that money in construction which can be used to rehabilitate and alter old facilities for new purposes becomes crucially important then. If there aren't new starts, there really has to be attention paid to what ways can you support the programs by modifying and improving old facilities as an interim measure. So GPP, while it is not the most exciting subject that we come and talk to you about, is one of the most important as we look toward fiscal year 1986.

That, Mr. Chairman, completes my remarks.

Mr. **Stratton**. How much was taken out for those two buildings that you mentioned?

Dr. **Kerr**. The three that were dropped totaled $266 million, $18 million in terms of fiscal year 1986 first-year funds. In terms of total, though, let me not disguise what they really are.

The Laboratory Data and Communications Center is about $27 million total estimated cost—the dual axis radiographic test facility, about $29 million. Even though for the first year it would be $2.8 million.

Then there is the big one, and the reason is that it is like our present plutonium facility or like building 371 at Rocky Flats—it has to have all of those protective measures for handling plutonium. It would likely be over $200 million. We estimate $210 million.

Mr. **Mavroules**. If you were to prioritize those three buildings, which one would you prioritize as the one that you would want the most?

Dr. **Kerr**. In terms of supporting the current program, this one, the Laboratory Data Communication Center. That is the most pressing need we have in terms of properly housing and working with the computing and communications resources that go with it.

Mr. **Mavroules**. Thank you.

Mr. **Stratton**. Any other questions?

Thank you very much, Dr. Kerr.

You have given us an outstanding presentation and we certainly appreciate it and it is very understandable. We hope that you will be able to make your plane back to Los Alamos.

Dr. **Kerr**. I will make one or another. Thank you very much for your attention.

Mr. **Stratton**. Thank you.

[The following questions were submitted for the record:]

Mr. **Stratton**. Dr. Kerr, I believe you certainly deserve credit for maintaining an excellent scientific climate at Los Alamos while fulfilling a most demanding mission in the weapons program. What are the necessary ingredients to provide such a positive environment for basic research and mission-oriented work? How is the health of the Laboratory and what kind of long-range institutional planning are you doing at Los Alamos National Laboratory?

Dr. **Kerr**. Probably the single most important ingredient in providing a positive environment for basic research and mission-oriented work is to be able to work on nationally important problems which provide scientific and technical challenge. As long as the Laboratory is challenged by important missions with new research and development responsibilities, we will be able to attract and keep the best scientists and engineers who are really the heart of the Laboratory. There are, of course, other key ingredients to the Laboratory's research and development successes. We have excellent technical facilities and have been able to maintain and upgrade these facilities as the thrust of our work changes. With challenging research and development programs and good facilities, world class scientists and engineers are in a position to make significant contributions to the nation.

The core funding of the nuclear weapons program and the diversity of scientific disciplines that must function together synergistically at the state-of-the-art level are other important ingredients to our stability and technical vitality.

In general, the salaries and fringe benefits provided to our employees are competitive and we are able to attract high quality scientific and technical talent. However, in some cases it is becoming difficult to attract the best people because of salary. We are continually working with the DOE to assure that this does not become a major problem. Finally, the Los Alamos area is an attractive area to live in and to raise families. This fact is of great value in attracting the caliber of staff needed by the Laboratory.

Another important factor in the research and development environment is the opportunity to pursue research and development goals with a minimum of review and approval from various interests outside the Laboratory. Probably the most ominous trend in recent years has been the incredible increase in the number and extent of reviews and appraisals of how we manage our Laboratory, especially for the non-weapons programs. We work very hard to minimize the impact of this "micromanagement," but it continues and is an added problem in maintaining the research and development environment. We also believe the policy of leaving technical decisions to the laboratories has been an essential ingredient in our technical success.

The Laboratory is quite healthy and prospers in the sense of continuing to have important, challenging programs on which to work. As national needs shift, we have been able to find new challenges for our scientific and technical staff. However, as major uncertainty in DOE energy programs continues, the impact of reductions could lead to some shifting of technical staff to new, growing programs or some loss of staff. In general, this can probably be handled by normal attrition.

The University of California is a great attribute to us in the above element of the Laboratory's success and good health.

The Laboratory has prepared a formal Institutional Plan for the DOE for the last nine years. The time frame of this plan is five years beyond the budget year. It has been a useful process for interacting with the DOE, but the long-range planning for the Laboratory is much more extensive than the Institutional Plan. Long-range planning is done by the line management of the Laboratory assisted by planning staff, and policy boards in various areas of the Laboratory's responsibilities. For example, the Weapons Policy Board is responsible for policy and long range planning for nuclear weapons programs, strategic defense research, verification technology, and other defense research and development programs. We also have an Energy Policy Board, a Facilities Policy Board, etc. Through mechanisms such as these, the Laboratory is able to effectively address important long-range planning issues.

Mr. STRATTON. Dr. Kerr, your testimony last year before the Senate Armed Services Committee on Strategic Defense Initiative, which placed the program in the proper context of an evolving defensive strategy, was very valuable. I sense that there has been a much more positive public discussion of Strategic Defense Initiative since the last budget cycle. Do you? Please comment on the advantages of emphasizing the benefits of a less than completely deployed "leak-proof" system. I sense that the goal of protecting our cities in a fail-safe manner may be extremely difficult, but the deterrent quality of somewhat "leaky" systems is considerable. Please give us your views on this issue.

Dr. KERR. The last year has been characterized by a wide-ranging debate on the technical feasibility of strategic defenses and their strategic implications.

The scientific and technical issues related to strategic defense are complicated and complex. Early surveys of these issues, which were highly critical of the feasibility of strategic defense, tended to derive their conclusions from the preliminary work presented in the Fletcher Report and from independent analyses. In the last year, the scientific and technical community as a whole has done considerable additional work on these issues. This work has led to a more favorable impression of the technical feasibility of strategic defense.

The work of the last year has been reviewed by and discussed with the early critics of Strategic Defense Initiative. Many key issues still need to be resolved. Nevertheless, it is my view that, as a result of this debate, a common frame of reference is beginning to emerge which will help us to judge our progress toward solving the basic scientific and technical issues associated with strategic defense weapons.

There are many advantages that may be realized from a "less than perfect" defense. The key ingredient is to create a defense that adds uncertainty to an adversary's offensive planning so that he cannot reliably predict accomplishing a meaningful military objective through use of his nuclear weapons.

The success of an attack on terminal defenses depends on the arrival of more warheads than there are defenders, or on the arrival of the right number of warheads in sequence to systematically blind the defenses and reduce intercept probabilities. This is what is known as a structured attack.

Intercepts of warheads in boost and mid-course greatly complicates this kind of planning. First, when attacking MIRV'ed boosters, the defenses might destroy as many as ten warheads and numerous penetration aids for each booster destroyed. Secondly, because defenses destroy warheads randomly in the first two phases of flight, the attacker cannot know in advance which warheads the defense will destroy. Consequently, he cannot be certain that enough warheads in the right configuration will survive to ensure penetration of the terminal defense around each target.

Even at moderate levels of defense effectiveness, this random kill process has a disproportionate effect on the attacker. And with each incremental improvement in the ability of the defender to intercept warheads in space, the attacker must devote larger and larger numbers of warheads, booster, or both to his attack plan.

A defense system which incorporates intercepts in the boost and/or mid-course with terminal defenses can exert extreme leverage over the attacker, even if that system is not "leak proof," since offensive force increases will not necessarily restore the attacker's confidence that all of his objectives will be met.

If the defense can impose and maintain a high level of uncertainty on the attacker, at a favorable cost exchange, the attacker may conclude that a continuing investment in offensive forces will not restore his confidence. If defenses can convince an aggressor that a continuing reliance on offensive forces will not help him to accomplish his strategic objectives, we will have taken a necessary first step toward realizing promise for Strategic Defense Initiative contained in the President's March 1983 speech.

In the meanwhile, there are a number of ways in which interim or intermediate defense deployments could support United States national security. These interim or intermediate deployments can be valuable in themselves. For example, defenses could be deployed which provide protection against accidental launches or small, irrational attacks by emerging nuclear powers which possess ballistic missile delivery systems for their small nuclear arsenals. They can also form the foundation upon which we could build more capable defenses.

Under conditions where defenses are less than perfect, prudence would require that the United States maintain offensive retaliatory forces. The size of this force would be proportional to our confidence in the defenses protecting ourselves and our allies. As the defenses improve, the size of the offensive force could be reduced. Within this reduced force, penetration could be assured by tactics and, depending on the state of air defenses, greater concentration on aircraft delivered weapons. Greater reliance on bombers has the added advantage of reducing first strike instabilities and enhancing crisis stability since, unlike ballistic missiles, bombers can be recalled.

Working together with the defense system during a transition phase, these offensive forces would assure an aggressor, in the language of our current deterrence policy, that he could not achieve his own military objectives and that any gains he might make would be far outweighed by his own losses.

In the context of our alliance commitments, interim or intermediate defenses might enhance stability and deterrence in a number of ways. Such defenses could reduce NATO's requirement to balance any future modernization or expansion of Soviet ballistic Intermediate Nuclear Forces (INF). In the same way that limited defenses would have to be combined with offensive forces here at home, the same would be true in the theater. By deterring limited conventional or nuclear ballistic attacks against allied retaliatory forces and working with defenses of vulnerable airfields, theater anti-ballistic missiles could help to assure the survival of NATO's retaliatory capability. As a result, NATO's strategy of flexible response could be enhanced rather than, as some critics have argued, eroded.

It is my view that less than perfect or leaky defenses can serve to fortify our present deterrent posture. But these incremental increases in our defense capability need not be in opposition to a longer-term goal of relying more heavily on defenses as the basis of our deterrent posture. In moving toward this long term goal, we probably do not need to aim only for perfect defenses.

In thinking about defenses, a distinction is usually made between defending hard targets, e.g., missile silos, and softer targets, e.g., cities. But boost and/or mid-course intercepts work to protect cities, and therefore people, as well as hardened military targets. Terminal defenses around every target profit from the random intercept process. In the case of cities, as the space intercepts become more effective—as the total number of warheads destroyed goes up and the structure of the attack is disrupted—the probability that the terminal defenses will be successful increases considerably.

A well designed defense architecture, though providing less than perfect defense, would provide considerable capability for defending people and might practically foreclose the use of offensive nuclear forces to accomplish any realistic and useful national objective.

Such a comprehensive architecture would, of course, require many years of further development to achieve.

Mrs. LLOYD. Dr. Kerr, where is the largest program growth at your Laboratory? Is it in areas where you have a strong capability?

Dr. KERR. The fastest growing program at Los Alamos is the ensemble of activities encompassed within the Strategic Defense Initiative. We are currently leaders in many aspects of the technology ranging from lasers and accelerators to space power sources and satellite surveillance systems.

We believe this Laboratory is ideally suited to evaluate a wide variety of these technologies because of (1) our extensive knowledge of offensive nuclear weapons systems including their vulnerabilities and effects, (2) the multi-disciplinary aspects of both the Strategic Defense Initiative problem and the Laboratory's capabilities, and (3) extensive facilities, such as Antares, that have been built to augment our weapons research capabilities now allow us to rapidly test Strategic Defense Initiative concepts as I discussed in my testimony before you on February 21, 1985. The extensive computing capabilities of this Laboratory are also of vital importance to the rapid evaluation of new concepts prior to the commitment of extensive experimental programs.

We find that Inertial Confinement Fusion facilities such as Antares, KrF laser, and the Target Fabrication Facility are playing a vital role in Strategic Defense Initiative research. We are extremely concerned about the negative impact on our ability to operate these facilities productively within the proposed DOE budget. The value of these facilities has also been noted recently by the President's Science Advisor. Quoting from his February 28, 1985, press release, "But, science is also unpredictable. Today the Antares project at Los Alamos offers exciting new opportunities to benefit research in nuclear weapons physics. Moreover, as one of the most powerful lasers in the world, it represents an important contribution to the base of knowledge that makes President Reagan's Strategic Defense Initiative feasible today."

Mrs. LLOYD. Dr. Kerr, Los Alamos National Laboratory is involved in space nuclear power (SP-100) programs, which we authorize on the Science and Technology Committee, in addition to research and directed energy weapons. This development will ultimately support the Strategic Defense Initiative Office as well as NASA. What do you believe are the nearest-term technologies for boost-phase vehicle intercept? I understand the DOE funding for space power support of multi-megawatt systems is zero. Shouldn't we be getting on with funding such technology development now if we are to meet high power requirements for neutral particle beams, lasers, and kinetic energy weapons? How can DOE carry on a complementary program to the $20 million DOD effort in FY 1986 with no funding?

Dr. KERR. Because of the long lead times involved, it is imperative that we initiative a vigorous program to develop the technology required for high-powered space reactor systems. The DOE has the statutory role of developing new reactor technology and has been working with the Strategic Defense Initiative Office in this area. The DOE would be much more effective, however, if they were also providing funding to complement that earmarked by DOD for this effort. This dual funding approach should provide a sufficient level of support to ensure the needed rate of progress in developing this important technology.

Kinetic energy weapons, such as chemical rockets and neutral particle beam accelerators, appear to us to be the nearest term nonnuclear technologies. The major problem we see for boost-phase intercept is warning and reaction time.

Mrs. LLOYD. Dr. Kerr, I want to compliment you on your strong and clear stand on the safeguards and security issue at Los Alamos National Laboratory last year in the face of some very reckless criticism. Do you believe that all the significant gaps in terms of responses to realistic threats have been addressed in this FY 1986 budget submittal? I noticed that the Safeguards and Security budget is down slightly from FY 1985 and wondered if the laboratories are satisfied. What are you doing differently (as a result of DOE guidelines) from the way you operated in FY 1984 in weapons testing and related areas?

Dr. **Kerr**. We do believe that all the significant gaps in terms of responses to realistic threats have been addressed in the FY 1986 budget submittal.

The Laboratory has not changed nor streamlined any of its security and safeguards operations since FY 1984 as a result of any specific DOE guidance. However, DOE has concurred in the improvements we have made and has provided important funding support.

On the other hand, the congressionally approved funding made available for Laboratory safeguards and security upgrades in early FY 1984, FY 1985, and FY 1986 has permitted the implementation of long-awaited enhancement plans.

With the recent capital and operating funds made available for Laboratory Safeguards and Security upgrades in early FY 1984, FY 1985, and FY 1986, plus the $7.5 million congressionally approved "line item" for FY 1986, Los Alamos has been provided the capability to:

(1) Reduce the number of Category I Special Nuclear Material (SNM) sites from eight in early FY 1984 to four in early FY 1985, without operationally impacting the research and development in weapons testing and related areas. Consolidating SNM from certain sites with the material at other sites has allowed for a cost-effective "by product" plus reasonable assurance protection of the critical assets; i.e., instead of recurring operational security and safeguards costs of about $1.5 to $1.7 million per year at each of eight sites, the Laboratory can now provide "reasonable assurance" protection at four sites for about $2.3 million each per year, which is a considerable security and safeguards savings.

(2) Moderately increased the protective force from about a 260-person level to nearly 300. [Deleted.]

(3) Harden our four Category I SNM facilities by added walls, steel cages in front of vault doors, more rapid detection systems (CCTV, infra-red detection, microwave detectors, etc.), entry stations, vehicle traps, helicopter landing denial systems, guard towers, state-of-the-art vehicles, etc. All these enhancements provide varying degrees of impedance to an adversary resulting in longer penetration timelines. Conversely, our back-up responding protective forces gain the valuable time required to reach the area(s) of concern.

As has been outlined briefly, the monies made available to implement the programmatic approach identified as early as 1981 by the Laboratory management for increased security and safeguards and upgrades have caused a significant change since 1984 at Los Alamos National Laboratory.

Mr. **Stratton**. Our next witness will be Mr. Ronald W. Cochran, the Deputy Assistant Secretary for Nuclear Materials for the Department of Energy.

STATEMENT OF RONALD W. COCHRAN, DEPUTY ASSISTANT SECRETARY FOR NUCLEAR MATERIALS, DEPARTMENT OF ENERGY

We will be happy to have your testimony, Mr. Cochran.

Mr. **Cochran**. Thank you, Mr. Chairman.

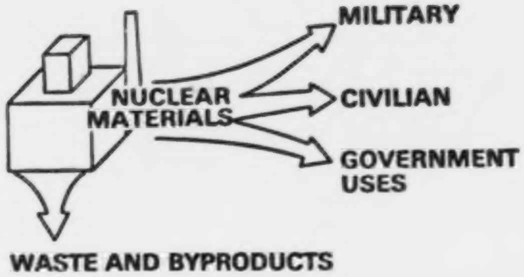
Mr. Chairman and members of the committee, it is a pleasure to be here before you this afternoon to discuss the nuclear materials budget request for fiscal year 1986. I have a prepared statement which, with your permission, I would like to submit for the record and then summarize.

Mr. **Stratton**. Without objection, we will put that in the record and you may proceed orally.

Mr. **Cochran**. Earlier, General Hoover referred to the new team. I would like to introduce two other members of the team, Mr. John Meinhardt who is the Director of the Office of Nuclear Materials Production, and Mr. Dave Leclaire, Director of the Office of Defense Waste and Byproducts Management.

DEFENSE PROGRAMS — NUCLEAR MATERIALS

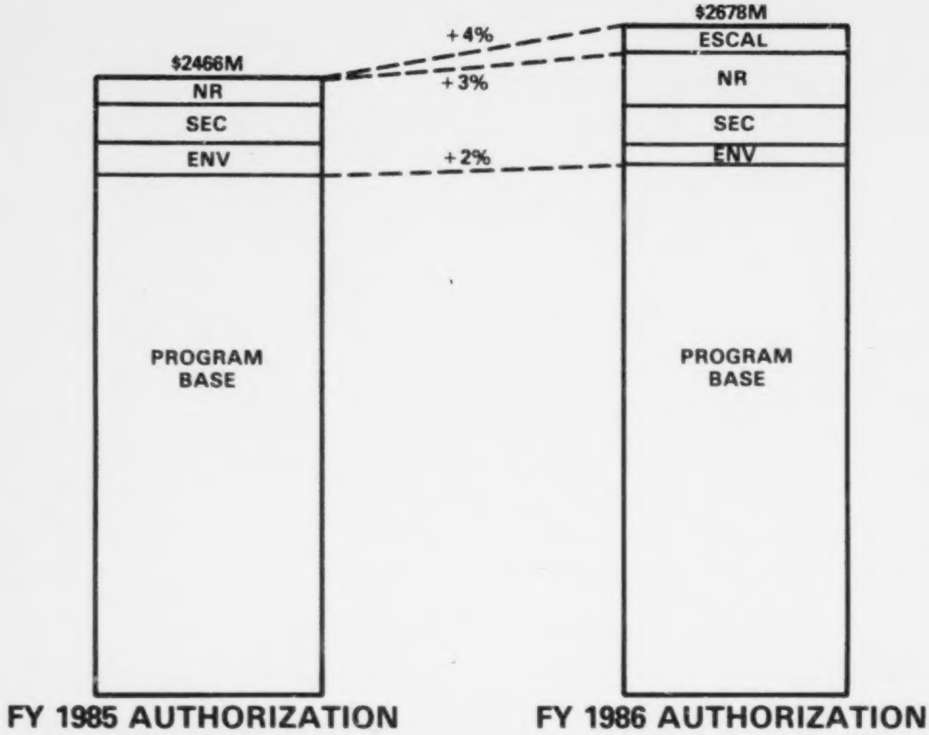
OBJECTIVE



NUCLEAR MATERIALS PRODUCTION

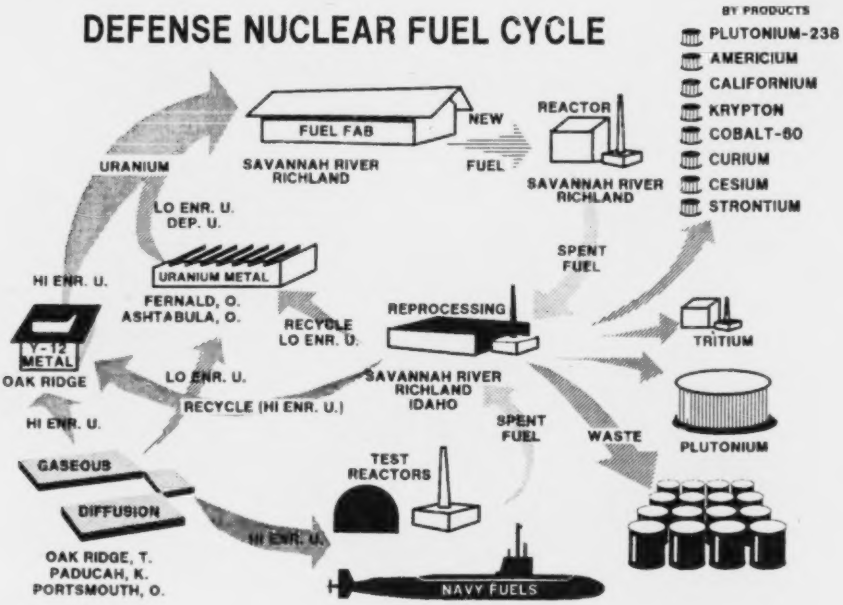
The objective of the Nuclear Materials Production Program is to produce the reactor products for defense activities, as well as other government and civilian requirements. In the process of producing these materials, we produce waste and also some useful byproducts. We do not produce enriched uranium, although we budget for enriched uranium both for Defense Programs use and for the nuclear Navy.

Our budget, which I will first summarize and then describe in more detail during the presentation, is almost $2.7 billion additional authorization, up from $2.5 billion in 1985. The increase in the program base is only about 2 percent, but there have been increases in other areas that bring the total amount to about 9 percent. Those are indicated on this chart.



I should point out that you have heard a lot about security and environmental matters, and you will hear more as we go through the subsequent Defense programs testimony. In our case, we think the Nuclear Materials Production Program has turned the corner. In fact, our request for security and environmental activities is down by about $37 million.

DP30732T.03 (Floppy DP30732)


DEFENSE NUCLEAR FUEL CYCLE
BY PRODUCTS
PLUTONIUM-238
AMERICIUM
CALIFORNIUM
KRYPTON
COBALT-60
CURIUM
CESIUM
STRONTIUM
FUEL FAB
SAVANNAH RIVER
RICHLAND
NEW
FUEL
REACTOR
SAVANNAH RIVER
RICHLAND
URANIUM
LO ENR. U.
DEP. U.
HI ENR. U.
URANIUM METAL
FERNALD, O.
ASHTABULA, O.
SPENT
FUEL
RECYCLE
LO ENR. U.
REPROCESSING
SAVANNAH RIVER
RICHLAND
IDAHO
TRITIUM
Y-12
METAL
OAK RIDGE
LO ENR. U.
RECYCLE (HI ENR. U.)
HI ENR. U.
SPENT
FUEL
WASTE
PLUTONIUM
GASEOUS
DIFFUSION
TEST
REACTORS
HI ENR. U.
OAK RIDGE, T.
PADUCAH, K.
PORTSMOUTH, O.
NAVY FUELS

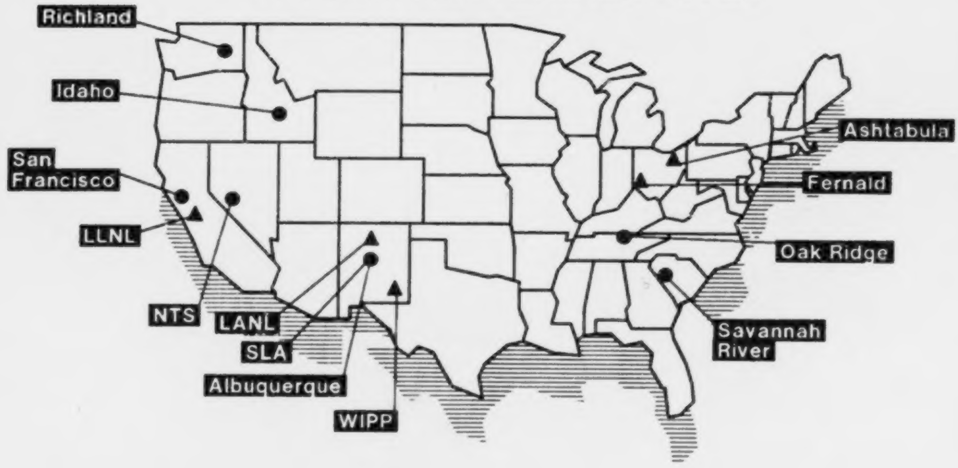
Many of the committee members have seen this next chart before, but I want to walk through it for the new members to tie together all the pieces of the nuclear materials activity.

NUCLEAR FUEL CYCLE

We start with uranium from the gaseous diffusion plants which are operated by the nuclear energy organization within DOE. Depending on the type of uranium, high enrichment or low enrichment, the material goes to one of the two feed material sites for conversion into metal to fuel the production reactors. The uranium is shipped from either the Oak Ridge, TN, or Fernald, OH, site to Savannah River or Richland where it is fabricated into fuel or targets and irradiated in reactors. The spent fuel and targets are then processed on site to recover the tritium and plutonium that we need for our activities, as well as other byproducts.

We also close the fuel cycle for the nuclear Navy in that we process the spent fuel from the naval propulsion reactors, and reclaim the highly enriched uranium [deleted] for fueling the Savannah River reactors—a very cost-effective process.

NUCLEAR MATERIALS SITES



If you look at the locations of our activities, they are scattered widely across the United States. The principal production site is in South Carolina bordering on Georgia, the Savannah River plant, but we also have major sites at Richland, WA, Idaho Falls, ID, Oak Ridge, TN, and Fernald, OH.

Additionally, we have defense waste sites in Nevada and in New Mexico. In particular, I will talk later about the one in New Mexico.

NUCLEAR MATERIALS SUPPLY/DEMAND

A number of questions have come up about the adequacy of the supply of nuclear materials. I would like to address those questions. This dashed line represents the cumulative net demand for nuclear materials, plutonium, and tritium, to build the weapons that are identified in the current nuclear weapon stockpile memorandum approved by the President just over a week ago.

This solid line represents production, including the initiatives I will describe later. These will allow us to produce materials which cumulatively would meet the requirements indicated by this dashed line through fiscal year 1998. In other words, we are able to meet the approved requirements through fiscal year 1988, but with very little margin. Also, [deleted].

We are just about at full capacity in terms of what we can produce with existing facilities. We are working very hard to install some additional efficiencies to allow us to get a little more production, but it is a rather marginal situation. [Deleted.] That would be the amount indicated by the dotted line. [Deleted.]

But does this really tell you where we are with regard to having enough materials to make weapons this coming year?

[Deleted.]

PLUTONIUM PRODUCTION OPTIONS

We are dedicated to producing nuclear materials in a cost-effective manner. I will summarize this chart [deleted] by saying that in operating the three reactors that we are currently operating at the

Savannah River plant, [deleted]. When the Savannah River reactor we have been renovating for the past couple of years comes on line in October of 1985, [deleted].

[Deleted.]

Additionally, we are able to produce what we like to call super grade or high grade plutonium in these reactors—plutonium which has 3 percent of the isotope 240 in it. We are able to take that plutonium and blend it with lower grade plutonium that was produced many years ago in the N reactor at Richland which has a higher plutonium-240 content, about 12 percent. By blending this plutonium, we can get down to the plutonium-240 content, about 6 percent, which we use for weapons and which the entire weapons complex was built to handle.

On this manner we are able to take advantage of otherwise unusable material. The incremental plutonium that you get from blending is quite cost effective plutonium. All that is involved is really processing cost [deleted] and also increased waste cost.

[Deleted] N reactor is a bit more expensive to operate because it produces steam, unlike the reactors at Savannah River. Because of this, we are able to sell about $50 million worth of steam each year [deleted] which makes it comparable with the Savannah River cost.

We are looking initially to try to increase the efficiency of these reactors. One [option] is a different type core for the Savannah River reactors where we would be able [deleted] increase in the production of those reactors. That is called Mark 22S/25 core and depending on how much we have to pay for the feed material, it could be quite cost effective incremental plutonium production. [Deleted.] If we are able to get feed materials from inventory, it is much less.

Another initiative that we are pushing very hard is a special isotope separation [SIS] process. We feel that the SIS process will be very useful in allowing us to utilize plutonium which has already been produced and which is not now usable. The cost for that plutonium, in terms of getting it from a nonusable state to a usable state, [deleted] so it is a very cost effective approach as long as you have feed material for it.

Mr. STRATTON. The N reactor is where?

Mr. COCHRAN. Near Richland, WA, at the Hanford site.

Mr. STRATTON. That is not to be confused with the new production reactors that Mr. Derrick was talking about.

Mr. COCHRAN. That is correct, although I will discuss the new production reactor and the plans we have for study later in the testimony.

The last item on the list is the plasma separation process. That is a technical process for isotope separation which allows us to take some of the neutron absorbers out of the fuel in the Savannah River reactors to get higher efficiency from the reactors. Technically this looks like a good process which could pay off in the long run. However you only get an additional small increment of production in any given year. In our budget we are continuing the R&D on this process, but we have not requested funding to move out with deployment of the production project due to budget constraints.

ANNUAL PRODUCTION SUMMARY

[Deleted.]

I will explain these initiatives again. The N reactor production is shown at the bottom of the chart. The Savannah River reactor production really involves three basic increments, four increments counting blending. This entire part of the chart is the Savannah River contribution.

[Deleted.]

The plutonium that we produce, as indicated earlier, can be blended with other previously produced lower grade plutonium to get some additional weapons grade plutonium.

Additionally, with the high productivity cores, we get a slight increase in production from the reactors that would give this kind of increment. When the special isotope seperation process comes on line utilizing the feed that we currently have, we get these additional increments of production.

Now, obviously, you could continue to try to blend this material. However, it becomes progressively more unattractive to try to blend because the 240 content of some of the lower grade blend stock gets fairly high.

In terms of cumulative production, this top part is exactly the same supply and demand curve that I showed you earlier. Over the planning period from 1984 to the year 2000, we get this much production from the Savannah River reactors.

We are able to supplement that production by blending this amount. SIS coming on line would contribute this amount and Mark 25 would provide the additional increment on top. If one were to blend all the way out, rather than using SIS, you would lose about the amount that is shown for the Mark 25. It is a coincidence that it happens to be approximately the same amount, but it is.

COMPARISON OF U.S. AND U.S.S.R. PRODUCTION

Now I would like to provide a quick look at what the opposition is doing. You saw some of this information yesterday, but I will touch on it again. [Deleted.] That is really about all we can produce with the existing facilities that we have in the system.

[Deleted.]

The issue is whether we should have more production or production capacity or whether we are in an adequate position right now.

URANIUM REQUIREMENTS

I have been talking all along about materials from reactors. We are also responsible for procuring uranium from the Department of Energy's gaseous diffusion plants as required for weapons, reactor operations, and the nuclear navy.

In the case of highly enriched uranium for weapons and reactor operations, we produced a great deal back in the sixties. We have been basically living off that inventory since that time. [Deleted.] We are slowly using that inventory. We use it to supplement the material that we need to run the Savannah River reactors. We use some in test reactors, and some of it in weapons tests.

We are now approaching a point where in the late eighties, about 1988, we project that our needs will start to exceed our supply if all those weapons that are in the stockpile memorandum are still on schedule. We have got to start procuring additional highly enriched uranium to produce those weapons systems.

We are working now to make sure that we have the technical capability to do that. Two things are required to have that technical capability. One of those is a facility which the committee authorized last year for converting uranium hexafluoride to uranium tetrafluoride to produce highly enriched uranium metal at Oak Ridge. It is well underway. We expect that facility to come on line in 1988. The total estimated cost for that facility is about $20 million.

Additionally, we are going to have to do some rework of the Portsmouth facility which produces the highly enriched uranium. There are a number of facilities that enrich uranium up to a few percent enrichment, but there is only one that highly enriches uranium for naval propulsion and for weapons. The rework is going to involve rewinding a lot of electric motors and upgrading the facility in other ways to operate it at a higher production capacity than we have for many years.

Mr. STRATTON. Is that the level higher than the uranium required or plutonium required for the naval reactors?

Mr. COCHRAN. They are comparable enrichments.

We will be able to upgrade that facility for a fairly modest expenditure of less than $10 million. We are moving out to start doing that so that we will have the capacity to meet requirements if they materialize. But it will call for substantial additional funds starting in about 1987 or 1988, depending on what the precise weapons requirements happen to be.

Mr. KLEIN. Who owns that plant?

Mr. COCHRAN. The Department of Energy.

Mr. KLEIN. And is it administered by the Nuclear Energy organization?

Mr. COCHRAN. Yes, the Nuclear Energy organization.

Mr. KLEIN. Nobody but defense programs has any use for any of that highly enriched uranium? Is there anything that would prevent the transfer of the ownership of that plant to defense programs?

Mr. COCHRAN. There are two steps involved in obtaining of the highly enriched uranium. One is getting the uranium up to a low enrichment of 2 or 3 percent. This can be done in any DOE diffusion plant—Oak Ridge, Paducah, or Portsmouth. This uranium is no different than uranium you might buy to operate commercial reactors. There is a portion of the Portsmouth plant which then takes that material on up to the enrichment that we need.

There is no fundamental reason why that needs to be in one program or another, to the best of my knowledge, although you do perhaps get some management advantages from having it all, under the same people who are running the overall enrichment complex.

Mr. KLEIN. We have the disadvantage of having to pay the commercial rate for the product.

Mr. COCHRAN. We have to pay essentially full cost recovery. That is a little different from the commercial rate. There was a GAO report that came out about 2 years ago which concluded that we in defense were not paying full cost recovery for the uranium coming from the highly enriched portion of the plant.

As far as the uranium coming from the low enrichment portion of the plants, we actually pay a slightly lower price than the commercial customers because we are not charged for depreciation on capital and imputed interest. But it is the same as commercial rates except for that kind of reduction.

Now, it turns out that because of special equipment requirements, it is somewhat more expensive to operate the high enrichment portion of the Portsmouth plant. We are paying full cost recovery for that which is causing our overall cost to go up by a few percent in excess of those costs paid by commercial customers.

I might add that all those plants are operated under the supervision of the Oak Ridge Operations Office, so you do have uniform management under one organization in the field regardless of which program organization administers the activity.

[Deleted.]

IMPORTANCE OF TRITIUM SUPPLY

Mr. STRATTON. As I understand it, the material that is really in shortest supply when you get down to it is tritium. Is that correct?

Mr. COCHRAN. Well, tritium, yes and no. Tritium is the most critical because it has a short half-life. With a half-life of a little over 12 years you lose about 5 percent of it per year through natural decay. So you need a continual replacement supply of all weapons in the stockpile that have tritium. Tritium is the most important in terms of being the most fragile of the nuclear materials you have to worry about. [Deleted.]

Another reason that tritium is more important, in a sense, is because once you produce plutonium, you basically have it forever, because of its 24,000 year half-life. Consequently the primary issue as far as tritium is concerned is not that it is in shortest supply, but that it is essential to have a reliable tritium production capacity to meet future requirements.

If you have a stockpile of plutonium that is *X* number of tons, many people would argue that you have enough plutonium to last forever. But if you have a stockpile of tritium, or whatever you need today, you lose a large fraction of that in just a few years. So you need a reliable supply of tritium as long as you have a nuclear weapons stockpile with tritium being utilized in it.

Mr. STRATTON. But the way to produce tritium is to reprocess your rods from the power plants; isn't that correct?

Mr. COCHRAN. Tritium is produced primarily by exposing targets of lithium to neutrons. We do that at Savannah River. We place a target inside an aluminum shell, expose it to neutrons, and it produces the tritium. Tritium can be produced in small amounts in other ways. We do not currently produce any at powerplants. Any source of neutrons could produce tritium, theoretically, but we simply don't do that, and as of today we don't have the technology to do that efficiently.

Mr. STRATTON. I thought the problem was that we had legislation that prevented us from reprocessing used fuel rods for weapons purposes.

Mr. COCHRAN. Yes, you are correct on that point. The legislation actually precludes us from utilizing special nuclear materials produced in licensed facilities for weapons. There is some plutonium produced in all nuclear reactors including commercial reactors, but not tritium in any significant quantity in the United States. We are not producing any tritium elsewhere. It is totally from the Savannah River Plant. The U.S.S.R. reactors I referred to earlier could potentially use a target of some type, probably lithium aluminate to produce tritium. Almost any neutron source technically could produce tritium. It just depends on the design as to how efficient it would be.

Mr. STRATTON. Aren't we shooting ourselves in the foot to put that limitation on what we can do with spent fuel rods?

Mr. COCHRAN. There are two problems with use of nuclear materials from licensed reactors for weapons—policy and technical feasibility. From a policy standpoint, this would undermine the longstanding distinction between peaceful and military uses of nuclear energy and would damage our nonproliferation efforts. With regard to technical feasibility I think Dr. Batzel addressed the point earlier. I think he said that at this time we do not have the technology to utilize that plutonium efficiently anyway. The weapons complex was designed and built to handle plutonium with less than 6 percent of the Plutonium-240 isotope, which limits the amount of radiation to which people who work in the plant are exposed. This other material with higher than 6 percent Plutonium-240 would cause higher radiation exposures, to the point that it wouldn't be practical for our weapons production complex systems to use it.

If one had a technology that would allow you to separate the isotopes, and I think Dr. Batzel indicated that special isotope separation [SIS] technology could potentially do that, you technically could conceivably utilize that plutonium. As you will hear later when I talk about SIS, we think the earliest we could have an SIS capability on line would be 1992. However, in addition to having the SIS capability, new facility modifications costing hundreds of millions of dollars and requiring years of construction would need to be authorized by the Congress before we would have the operational capability to extract the plutonium from the spent fuel from licensed facilities.

Furthermore, we can meet all of our approved requirements with our current and planned capability, assuming it continues to operate and that the initiatives move forward on schedule. Consequently, the unavailability of the special nuclear materials from licensed facilities does not present any immediate problems.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET REQUEST HIGHLIGHTS

- **CONTINUES BASE PRODUCTION ACTIVITIES**
- **SUPPORTS PRIORITY SAFETY, SECURITY AND ENVIRONMENTAL IMPROVEMENTS**
- **SUPPORTS ON-GOING PRODUCTION INITIATIVES**
  - **FACILITY RESTORATION**
  - **L REACTOR OPERATION**
  - **HIGH PRODUCTIVITY CORE**
  - **SPECIAL ISOTOPE SEPARATION**
  - **REACTOR PRODUCTION ASSURANCE (NPR)**
- **FUNDS DEFENSE URANIUM ENRICHMENT**
  - **NAVAL REACTORS**
  - **PRODUCTION REACTORS**

I will go into the budget in detail later but I wanted to give you highlights of our request.

First, we want to continue our base production activities, and we certainly want to take care of the priority safety, safeguards, and environmental improvements. We can't cover them all but we want to take care of those which are most important from a priority standpoint. Here are some of the ongoing production initiatives, at least the first four, which the committee has supported very strongly in past years. The facility restoration program is required to upgrade the aging facilities. The reactors and processing facilities did not get enough maintenance and new equipment funding over a long period of time, primarily back in the seventies. We have had to spend a great deal of money, over $400 million, to restore those to good operating condition. This has proceeded very effectively. L reactor operation I will talk more about later. That is restarting the reactor at Savannah River.

Earlier we talked about high productivity cores and SIS. Here is the strategy for a reactor production assurance program. The new production reactor activities have been subsumed within a broader strategy that we would like to discuss with you. Finally, we also fund for enriched uranium for naval reactors and to run our own reactors if we need additional material.

NUCLEAR MATERIALS PRODUCTION
CHANGES FROM FY 1985 AUTHORIZATION (DOLLARS IN MILLIONS)

FY 1985 AUTHORIZATION	$1,745.0
• CONTINUATION OF BASE PROGRAM INCLUDING SAFETY, SECURITY, ENVIRONMENTAL	– 23.1
• NUCLEAR MATERIAL PRODUCTION INITIATIVES	+ 46.6
• NAVAL REACTORS URANIUM REQUIREMENTS	+ 122.2
• ESCALATION	+ 74.7
FY 1986 DEPARTMENTAL AUTHORIZATION REQUEST	$1,965.4

Looking one step forward to what is in the budget, changes from the 1985 authorization are shown here. We want to continue the base program. The cost for doing that, actually the authorization requirements, are slightly less than last year, primarily because we are coming down, excluding escalation, by about $20 million in security and about $20 million in environment in terms of the authorization required for 1986.

For new initiatives, there is an increase requested. Included in the increase is funding for SIS development, and the Process Facility modifications project, which this committee authorized 2 years ago. This project will allow us to take the fuel from the breeder test reactor, the Fast Flu Test Facility, which contains plutonium originally produced in one of our production reactors, and to recycle that material so we can use it for feed for the special isotope separation process or for blending to get it back into the weapon-grade plutonium inventory.

Our largest increase by far is for naval reactor uranium requirements. As you are aware, naval reactors is building a new fuel fabrication facility at Savannah River. The material for start up of that facility is causing a major increase in the requirement this year for naval reactors enriched uranium. Plus, on top of that, there is escalation.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET SUMMARY
(DOLLARS IN MILLIONS)

	FY 1985		FY 1986 REQUEST	
	AUTH.	APPROP.	AUTH.	APPROP.
BASE ACTIVITIES				
CURRENT OPERATIONS	$1,231.0	$1,217.4	$1,267.3	$1,286.8
L REACTOR	43.3	43.3	60.7	60.7
SECURITY	142.4	138.0	127.8	139.8
SUBTOTAL	$1,416.7	$1,398.7	$1,455.8	$1,487.3
PRODUCTION INITIATIVES				
RESTORATION	$ 78.9	$ 82.9	$ 51.7	$ 47.7
IDAHO RESTORATION	15.5	15.5	20.1	20.1
PRODUCTIVITY RETENTION	0.0	0.0	28.2	28.2
REACTOR SAFETY	25.0	36.3	23.1	24.9
HIGH PRODUCTIVITY CORES	0.9	0.9	12.0	12.0
SPECIAL ISOTOPE SEPARATION	69.0	69.0	80.0	80.0
PROCESS FACILITY MODIFICATIONS	9.5	19.5	39.2	21.7
NPR/REACTOR PROD ASSURANCE	8.5	8.5	6.1	6.1
SUBTOTAL	$207.3	$232.6	$248.9	$240.7
OTHER				
NAVAL REACTOR SUPPORT	$ 121.0	$ 121.0	$ 249.2	$ 249.2
TOTAL MATERIALS PRODUCTION	$1,745.0	$1,752.3	$1,965.4	$1,977.2

FISCAL YEAR 1986 BUDGET REQUEST

I understand that you are interested in more information on some of the items within the budget request. I apologize for this chart being so busy but I did want to give you the opportunity to understand some of the budget details. The current operations are going up slightly. L reactor is going from a nonoperating condition and about $43 million in 1985, to an operating condition and about $60.7 million in 1986. Security, as I indicated earlier, is coming down a bit.

We are nearing the end of the restoration program, which is a 7-year program to restore the productivity of the complex; this will be the 6th year. There is only about $20 million left in a $462-million project to restore productivity to a high level.

Next is the Idaho Restoration Program. The Idaho site is where we process the spent naval reactor fuel. It was not included in the original restoration program for a variety of reasons, but we do need to have a new chemical processing facility there to allow us to process the spent fuel coming in from the Navy in the nineties. There is going to be a large increase in the amount we will be receiving. Productivity retention is a new project this year. Productivity Retention is related to the restoration project, but slightly different. When we started the restoration project we were operating the reactors in a mode that required only about half of the throughput at which we are currently operating those reactors. We were operating the N reactor to produce plutonium with 12 percent plutonium 240 and Savannah River to produce weapons-grade plutonium. The changed mode of operation has caused us to actually put material through those reactors and processing facilities at twice the rate we had been achieving earlier. So, to hold that very high productivity, the high capacity that I will show you, we need to start what we call the Productivity Retention Program to keep those aging facilities operating at very high capacity, with high reliability.

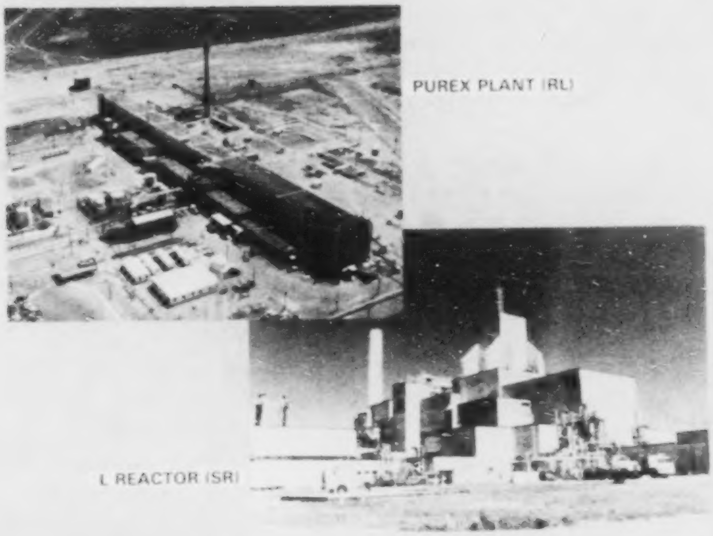
The high productivity cores, as I have described, will really be a test core in 1986 to make sure the cores will operate in the way we expect. I am happy to tell you that for the first time in the last 3 years we are proposing more money than we had the previous year for special isotope separation. I will talk more about what that will buy for us. But we think that technology is moving along quite well.

Process facility modifications I mentioned earlier. And this is the third year of funding for that very important project. For the New Production Reactor/Reactor Production Assurance Program, we are requesting $6.1 million to continue some studies. These are only studies. I will describe them for you in a later chart.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET REQUEST
(DOLLARS IN MILLIONS)

	FY 1985		FY 1986 REQUEST	
	AUTH.	APPROP.	AUTH.	APPROP.
OPERATING EXPENSES				
REACTOR OPERATIONS	$ 536.2	$ 535.9	$ 586.4	$ 586.4
PROCESSING OF NUCLEAR MATERIALS	439.8	439.8	493.1	493.1
SUPPORTING SERVICES	253.0	253.0	256.6	256.6
PROGRAM DIRECTION	20.3	20.3	21.3	21.3
URANIUM ENRICHING	142.8	142.8	258.9	258.9
TOTAL OPERATING EXPENSES	$1,392.1	$1,391.8	$1,616.3	$1,616.3
CAPITAL EQUIPMENT	117.7	117.5	123.4	123.4
CONSTRUCTION	235.2	243.0	225.7	237.5
GRAND TOTAL	$1,745.0	$1,752.3	$1,965.4	$1,977.2

For the new members, if you look at your budget material, you will see the same information recast in a different format. I didn't want you to think we switched numbers. This is the format you will see in your budget table.



PROGRAM ACTIVITIES

Now, I want to talk about what we are doing. We are hoping to restart the L reactor at Savannah River. The fuel has been loaded, ready for restart since October 1983. We have been waiting to complete a number of things but primarily a 1,000-acre lake which will allow us to cool the cooling water from the reactor before it goes back into the wetlands and river.

Mr. **Stratton**. Dr. Mansfield.

Dr. **Mansfield**. You mentioned before you had $40 million in operating expenses for L reactor for this year?

Mr. **Cochran**. Yes.

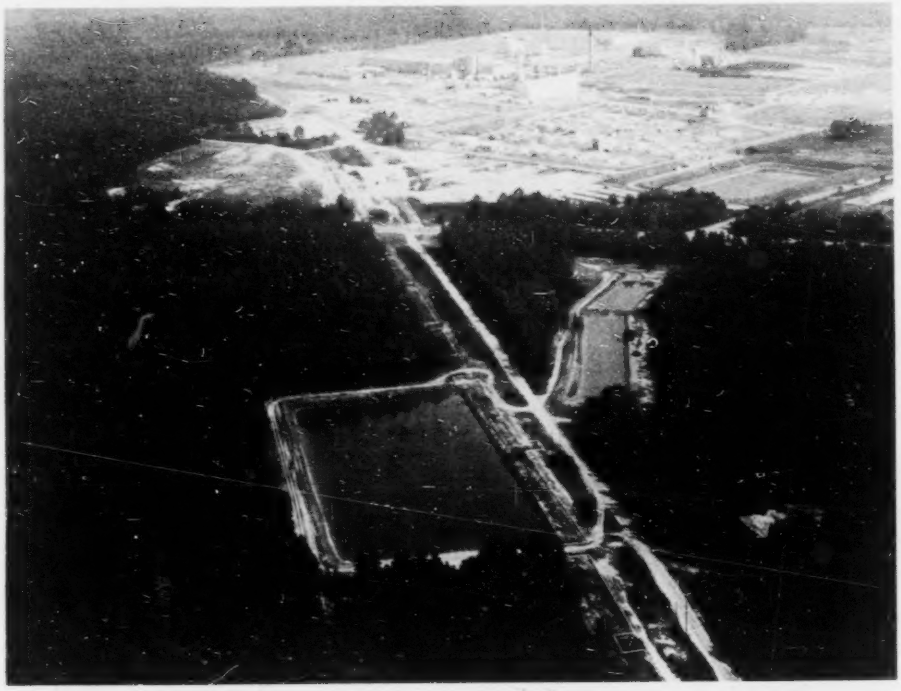
Dr. **Mansfield**. That was just to keep it warm?

Mr. **Cochran**. There is a large operating crew to support and it takes 2 to 3 years to train the people, so it is not feasible to release them and then bring them back in time for startup.

Dr. **Mansfield**. So another part of the bill is $40 million?

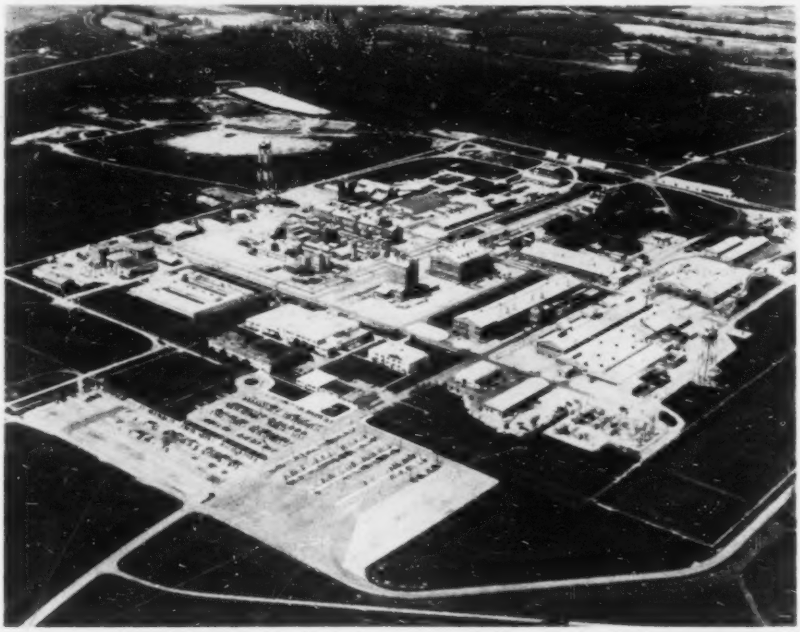
Mr. **Cochran**. There are a number of good things you can do from a training standpoint. We have taken advantage of that. We have run safety tests we wouldn't otherwise be willing to do because it would interfere with production. Yet it is an expensive proposition to retain a highly trained operating crew because you can't lay them off and get them back when you need them when you are going to restart the reactor in about 8 months.

We are also working very hard to keep costs down by processing plutonium scrap. Now, that sounds like it's not very important, maybe. But let me tell you, we have got substantial quantities of scrap nuclear material from the weapons fabrication processes, and other processes, that we must reclaim to try to keep the overall new production requirements down. This is a photograph of some of the plutonium scrap. It's in all sorts of slag and other forms. We are spending a fair amount of money at Savannah River, Richland, Los Alamos, and other places like Rocky Flats, to try to recycle the scrap material, even though it is technically somewhat difficult, in order to keep overall requirements for new production down.



I mentioned environmental matters earlier. This is a picture of the F separations area at Savannah River. This is where we actually process the spent fuel to recover, in this case, plutonium. You see here a couple of examples of seepage basins. For many years we have been operating so that some of the effluents from this plant were dumped into these basins to keep them from going off into the river and other streams. That was the 1950's technology for protecting the environment. As a result of amendments to the Resource Conservation and Recovery Act in 1984, this method is no longer adequate to meet regulatory requirements. We are going to have to get out of these seepage basins; we are supposed to be out by 1988. It may take slightly longer, but we are coming forward with a $55 million project, first year's request in fiscal year 1986, to allow us to get out of the seepage basins.

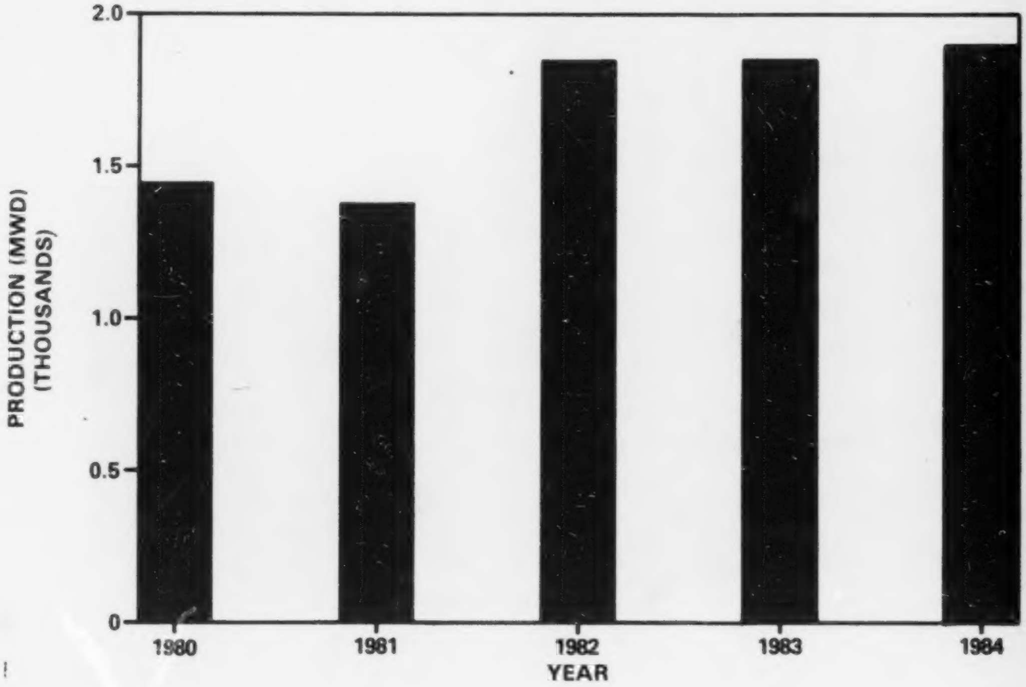
Now, the things that are in the basins that are causing problems are the cesium and strontium radioactive materials, but also mercury, chromium and other chemicals from the process of recovering the plutonium. Those are starting to show up in monitoring wells around the basins. So we are going to have to find ways to operate without the seepage basins.



Additionally, this is our Ohio plant, where, as I described earlier, we make the uranium metal for fueling N reactor and the uranium metal targets for the Savannah River reactors. This one has gotten a great deal of publicity in recent months because we had an emission of uranium oxide from one of the plants. This facility is going to require some significant environmental upgrades. This is a waste storage area that is an open lined pond. There were other ponds here that are now covered. The waste from the operation, including a great deal of depleted and low enriched uranium, has gone into those, along with a number of chemicals. We are going to have to clean that up in some fashion to meet the current regulatory requirements. In particular, the facility that caused the problem is this facility here, plant 9, where we had a baghouse, in which some of the bags came loose from their fixtures and allowed about 275 pounds of uranium oxide dust to escape up the stack. It settled out, as far as we can tell, on the plant site but it caused quite a bit of concern to the people in the community and the State of Ohio.

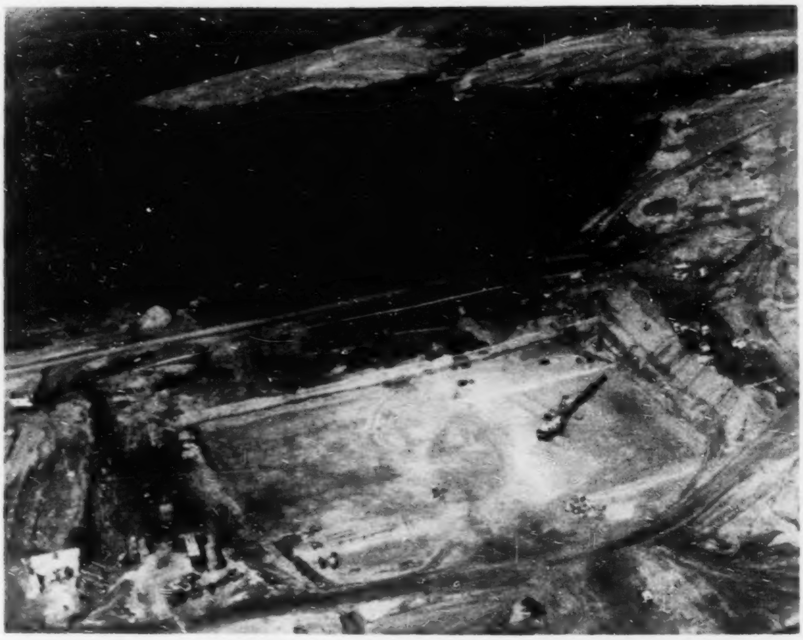
As far as we can determine, that particular incident, from a health and safety standpoint, did not cause any significant damage. However, if you look back over the 33 years the plant has been operating, there have been literally thousands of pounds of uranium dust that have gone up the stack and settled out in the surrounding area. We certainly are going to have to look at that to see what steps need to be taken to clean that up to meet current requirements.

SAVANNAH RIVER REACTOR PRODUCTION

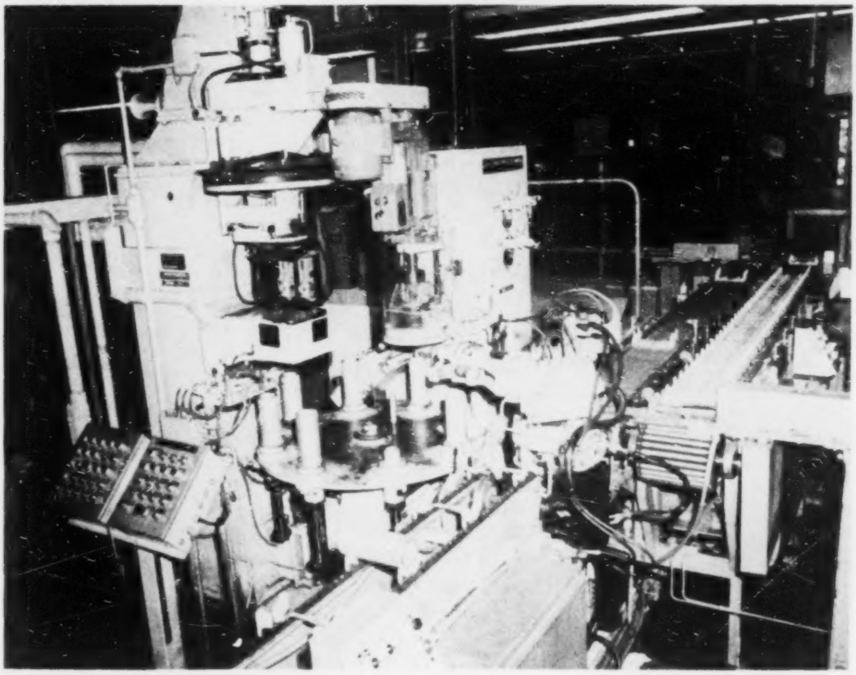


I mentioned restoration. The bottom line on restoration is that it has resulted in increased production and we are holding it there.

This is a chart of which we are very proud. It shows the production levels of our Savannah River reactors. Going back a few years before this, you could see a steady decline in the production. With the restoration program, we have pushed the production back up and are holding it there. In fact, in 1984 we set some new all-time records with production from the reactors.

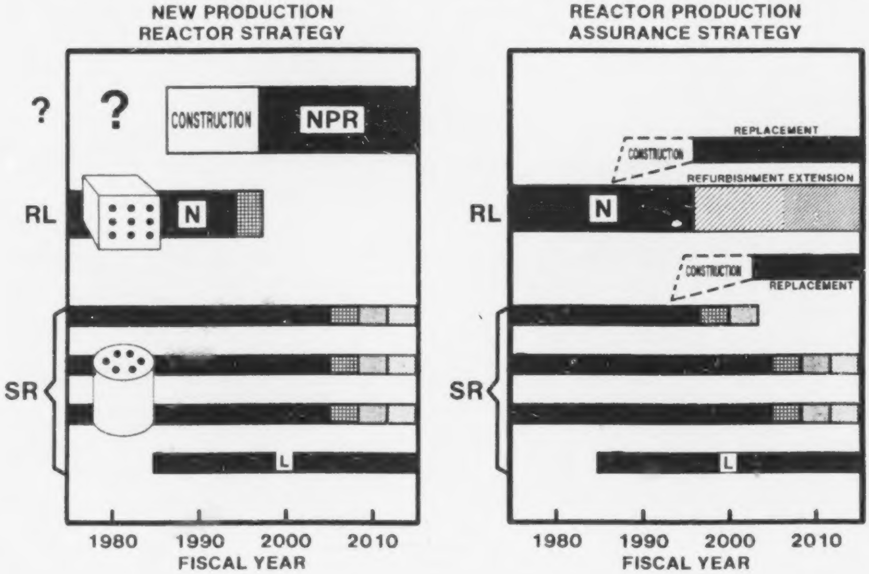


I mentioned the L reactor and the L reactor dam. This is the foundation for the dam. This area here (indicating) is a diversion dam upstream. This is Steel Creek. We are at present densifying the substructure under here to place the dam on top of it. The dam will be 2,300 feet wide, back up a lake about 5½ miles long, and cover about a thousand acres. That will allow the cooling water from L reactor to cool to less than 90 °F before it goes into the streams and on into the wetlands.



I mentioned the high productivity cores. This is a picture of fabrication of some of the target materials for the Savannah River reactors. All we are doing for the high productivity cores is replacing depleted uranium targets with natural uranium targets. That will provide a significant increase in production.

We talked about SIS with the committee earlier. I wanted to show you the latest design of the module. We have now tested a module of full-scale plant size equipment in the laboratory. We still need to do quite a bit of engineering development on the equipment to get it ready to go into production. We are proposing to continue the R&D and engineering development on the Livermore process and to start the conceptual design for building a production facility at the Richland site to allow us to deploy special isotope separation technology for contributing to our supply of weapon-grade plutonium. At this point we are limiting our request to conceptual design. That would allow us to have an operating facility on line by 1992.



DEFENSE PROGRAMS - NUCLEAR MATERIALS

NEW PRODUCTION REACTOR STRATEGY

REACTOR PRODUCTION ASSURANCE STRATEGY

Now let's discuss the new production reactor that Congressman Derrick talked about. I don't propose to respond at this time to all the issues that were raised, but I would like to talk to you about how we view the strategy that we have been following and the expansion of that strategy for our future studies. Perhaps it is most simply explained like this. We have a situation at Savannah River where there are reactors that have been operating since the early fifties. At some point in time those reactors are going to become operationally less reliable, just like an old automobile. They simply will not be able to produce like they have been. We just renovated L reactor, so we think it will have a longer life, but we don't know that for sure. We have not been able to identify any life-limiting features of these reactors, but one has to plan that, at some point in time, these reactors will reach the end of useful life in the sense you would have to spend so much on maintenance that it would be cheaper to do something else. At that point we would plan to replace one or more of them.

In the case of N reactor at Richland, WA, we have been able to identify life-limiting features of the reactor. That reactor has a design with pressure tubes inside a large 30-foot graphite cube which changes dimensions under irradiation. Our projections are that the graphite will grow in such a fashion that the reactor will reach the end of its useful life in about the 1997–98 timeframe if we don't take steps to change it in some fashion. What we have been looking at is a new large reactor which would start operations at the point that we could expect N reactor to shut down, some time in the mid-to-late nineties.

Because of the vital importance of tritium, as I explained earlier, we feel we really need production capability at more than one site. That was the thought behind making sure that there was something coming on line that would in effect replace the capability which N reactor currently offers us. We had not decided where to site it or what technology to use. As we indicated to you last year, we are considering the Savannah River plant, the Richland site, and also the Idaho site, as potential sites for the new capability. Our studies to date have been focused on a large capability, large enough to take care of keeping the stockpile effective by itself. It would not necessarily provide enough for some of the new weapons systems that are envisioned but it would keep the stockpile effective.

I would like to describe now what we are considering in terms of an expanded planning strategy. I need to emphasize that no firm decisions have been made on what we are going to do because this is so important to us and such a large investment that we feel we owe it to the Congress and the country to look very carefully at what the options are before locking into something. That is what we are trying to do.

Now, we also have to recognize that there is a budget deficit. We are looking very hard to try to find some options which would reduce what we call the funding profile for this capability. We estimate the large reactor would cost somewhere between $3 and $6 billion. That would have required budget years where we would have had approximately a billion dollars in the budget just for that one item. We are looking for something that would lower that profile. We have had studies underway to see if we can extend the life of N reactor, as well as to understand better the useful life of the Savannah River reactors. Those studies are not completed yet. We expect that the studies on N reactor will be completed later this calendar year and at that time we would try to decide whether it would make more sense to renovate N reactor and extend its life another 10 or 15 years or whether it would be more cost effective to replace it.

If we did replace it we feel that, consistent with keeping the budget profile down, we would probably need to replace it with a smaller reactor rather than the one we have been studying to date. If we did that, it would be clear that it would not necessarily satisfy all of the long-term tritium requirements. Another new reactor probably would be needed later on.

So we have, for purposes of our analysis, expanded our studies to include this planning approach. Again, when we have our studies completed, in about a year or so, we would have to decide whether to come forward to the committee to propose some action. We would expect that to be centered around what to do about the nuclear reactor to provide a long-term assured supply of these materials we are going to need.

NUCLEAR MATERIALS PRODUCTION, FISCAL YEAR 1986 BUDGET REQUEST—SUMMARY

Meets nuclear materials production requirements.
Supports priority safety, security and environmental improvements.

So in summary, for the Nuclear Materials Production area, we feel we can meet the approved nuclear materials production requirements although admittedly some of the options one might want to protect cannot be accommodated.

We also feel we are supporting the priority safety, security, and environmental improvements and working to be a good neighbor where sites are located.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

Now I would like to turn to the defense waste area. If you would rather ask questions on materials production now, we could do that, or I can go all the way through the defense waste part of it and take them both at the same time. Do you have a preference?

Mr. STRATTON. I think it probably would be good to go ahead with the waste because that is where the real crunch is.

Mr. COCHRAN. OK.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT—MISSION

Manage defense-related nuclear waste and byproducts: Operate waste facilities safely; restore waste processing and storage facilities; and pursue geologic disposal.

The mission in the waste area is, first of all, to manage our defense-related wastes so we can support activities for producing materials and producing weapons. We also have to restore some of our waste facilities to keep those in efficient operating condition and to meet new and increasingly stringent environmental requirements. Beyond that, we need to start moving from this interim waste storage mode which we have been in for many years to a final geologic disposal situation.

HIGH-LEVEL WASTE REPOSITORY

Mr. DYSON. Mr. Chairman, I know you all have been more tolerant than I have because I came late. But instead of having him go through all that rhetoric, why doesn't he get right to the issue of where they are going to put the waste? The proposals that have come up, I think every State is planning to sue where you have proposed sites. Just tell us the ups and downs of that.

Mr. STRATTON. We have already got the waste. The question is—

Mr. DYSON. Oh, I know. But I mean, what is the Department of Energy or DOD going to do if all these suits come about?

Mr. COCHRAN. I think you are probably referring to the question of a repository for the high-level waste. I assume that is the one you mean. There are also a lot of legal actions underway on low-level wastes and other things.

Mr. DYSON. All you have to do is just mention the subject and you can count on it.

Mr. COCHRAN. Yes.

Mr. DYSON. I have been on here for 5 years and we have been talking about finding sites and finding sites. We are not any further ahead, as I can see, except we are 5 years later still looking for sites and still, you know, what direction are you taking on this?

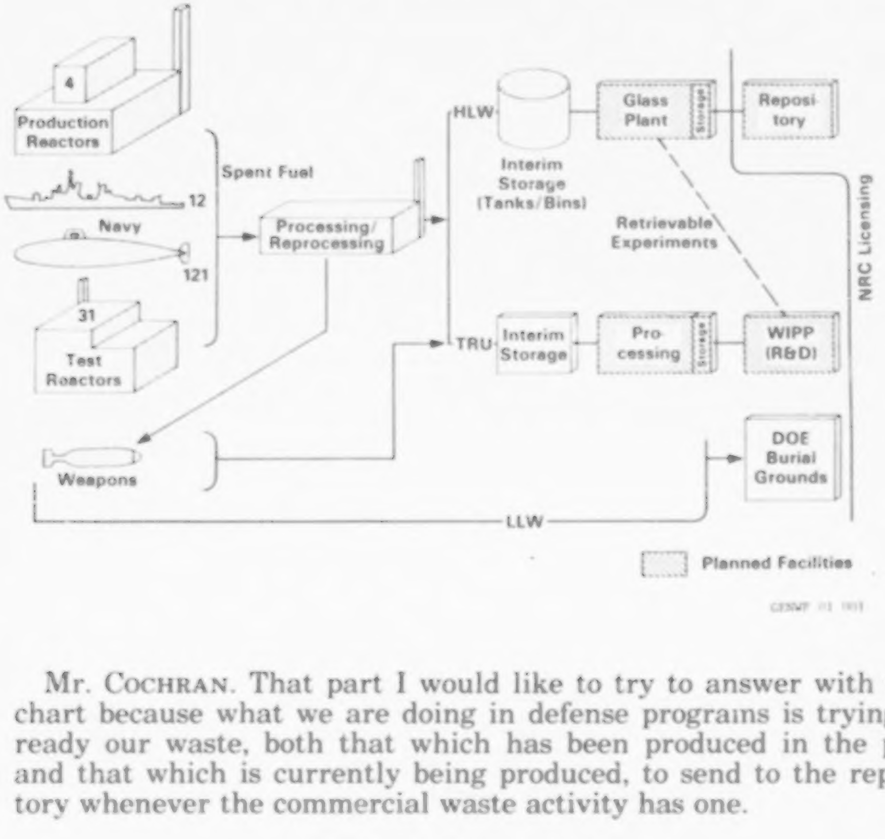
Mr. COCHRAN. OK. Not to duck the issue, but the question of finding a repository site is really not a Defense Program's responsibility. That is the responsibility of the commercial waste management activity within the Department of Energy headed by Mr. Ben Rusche. I understand that they have selected sites in three states on which to develop further information, the State of Washington, State of Texas, and State of Nevada. I am not in a position to discuss what further direction they are taking on this.

Mr. DYSON. Let me interrupt again.

Mr. COCHRAN. Sure.

Mr. DYSON. If you can't tell us that, maybe you shouldn't go into it. Then my question will be, what is this going to do to the program the longer we delay this?

DOE RADIOACTIVE WASTE: SOURCES AND MANAGEMENT


4
Production Reactors
Spent Fuel
12
Navy
121
31
Test Reactors
Processing/ Reprocessing
Weapons
HLW
Interim Storage (Tanks/Bins)
Glass Plant
Storage
Repository
Retrievable Experiments
NRC Licensing
TRU
Interim Storage
Processing
Storage
WIPP (R&D)
DOE Burial Grounds
LLW
Planned Facilities

Mr. COCHRAN. That part I would like to try to answer with this chart because what we are doing in defense programs is trying to ready our waste, both that which has been produced in the past and that which is currently being produced, to send to the repository whenever the commercial waste activity has one.

NUCLEAR WASTE POLICY ACT

I am skipping ahead a little to a study mandated by Section 8 of the Nuclear Waste Policy Act, which required the President to determine whether or not there would be a need to have a separate defense waste repository. That study has been completed. Recommendations from the Secretary of Energy have gone to the President.

That study concluded that it would cost in excess of $1.5 billion additional to have a separate repository for immobilized defense high-level waste. It also concluded that there was no particular advantage from a safety, or any other, standpoint to having a separate repository.

So the Department's recommendation was to send the immobilized defense high-level waste to the same repository that will be used for commercial nuclear power waste.

Mr. DYSON. I mean, that certainly makes sense. If it is going to be difficult to find one for DOD, it is going to be just as difficult to find one for DOE or anybody else. Essentially we are not really a whole lot further ahead than we have been.

Mr. COCHRAN. Mr. Rusche thinks so, but I would have to defer to him on that question. I am not the person to discuss that. We are much further ahead in readying our defense waste to go to that repository. We have made great progress in that area, which this committee has strongly supported.

Mr. DYSON. So it is really ready. We have just got to find a place for it.

IMMOBILIZATION OF HIGH-LEVEL WASTE

Mr. COCHRAN. It is not quite ready, but it is well on its way. I will describe it. The defense waste processing facility at the Savannah River plant, for example, would be the first facility in the country for routinely immobilizing high-level waste. It will take liquid waste stored in the tanks, put it into a borosilicate glass inside a stainless steel container, and that container will be ready to ship to the repository. That facility I will discuss later, but it is well underway. It will be operational about 1989, and at that time we will begin immobilizing our high-level waste in a glass form inside stainless steel containers ready to ship.

We will simply store it on site until the repository is ready. So I think we are acting in a very responsible manner in getting off to a good start on taking care of the defense waste problem. We do have to hand it over at some later date for disposal in a repository.

In fact, what I was going to go through is how we get to what I just gave you as a bottom line. We have waste being generated by a number of activities. Most of it comes out of the reprocessing area, including the high-level waste. We do have some transuranic waste coming from weapons manufacturing. Right now we are storing that waste, both high level and transuranic.

LOW-LEVEL WASTE

We are sending the low-level waste to DOE burial grounds similar to the three commercial low-level waste burial grounds that are operating. For the low-level waste we wouldn't expect to actually have to move again, but the transuranic and high-level wastes will have to be dealt with.

TRANSURANIC WASTE

We are well along in building facilities which will allow us to deal with those wastes, in the case of the high-level waste to prepare for shipment to a repository, and in the case of transuranic waste, to prepare for shipment to the waste isolation pilot plant, which we hope will be the final repository for transuranic waste. WIPP is a defense facility. Transuranic waste is low-level waste but with long-lived radioactive elements, primarily from weapons manufacture.

TRANSPORTATION OF NUCLEAR WASTE

Mr. STRATTON. You have two problems, do you not? One is to find a spot where you will place that repository for the defense waste, and you also have, do you not, the legislation that practically prevents any transportation of nuclear waste, whether it is by DOE or private companies.

Mr. COCHRAN. Well, we feel that we can transport the material within the existing legislative and regulatory framework to the best of my knowledge, although there are issues with regard to precisely how it gets transported.

Mr. STRATTON. Where do you transport it now?

Mr. COCHRAN. The high-level waste from our operations now is not transported. It is stored on the generating site at Savannah River, Richland, or Idaho. Transuranic and low-level wastes are transported for storage and disposal purposes respectively.

Mr. STRATTON. You have got the Knolls Atomic Power Laboratory up in Schenectady, the Kesselring site where we have several naval nuclear reactors operating. That has to be transported, as I understand it, down to Savannah, does it not?

Mr. COCHRAN. It depends. Spent fuel from the Kesselring reactors is shipped to the Idaho National Engineering Laboratory for reprocessing, and the low-level waste is sent to existing DOE burial sites.

Mr. STRATTON. Didn't you run into the problem of legislation that New York State had sponsored preventing any transportation through the city of New York?

Mr. COCHRAN. There was that problem. That was overturned. That recently became a very important issue when we were trying to transport some of the spent fuel from the Brookhaven Laboratory reactor.

Mr. STRATTON. That is right.

Mr. COCHRAN. It happens that transportation comes under my area of responsibility also.

Mr. STRATTON. The Federal judge indicated it was OK to transport it, right?

Mr. COCHRAN. That is correct, sir. We are transporting that material right now. We have just completed four shipments, and we are proposing to continue routinely shipping every few weeks.

Mr. STRATTON. I understand one of the members of the New York delegation, not myself, is introducing a bill, a new bill, to prevent those shipments, which presumably is going to pose a different problem for whoever is sitting on the Federal bench at the time.

Mr. COCHRAN. Yes, sir. I have not seen that, but I understand such plans are being made. There is a desire on the part of New York City to see us ship it in some other fashion, perhaps barging it to Connecticut and then transporting it by truck to Idaho in this case.

Mr. STRATTON. Connecticut says they don't want to carry the ball.

Mr. Cochran. At the moment, in spite of some resistance and some objections, we continue to try to assure the people of New York City and New York State that those shipments are being carried out in a safe, secure manner and that we are taking every reasonable precaution: in fact, some think we go beyond that, to protect the health and safety of the public, and we would like to continue.

Mr. Stratton. The trouble with this is that this is not really a rational matter. It is an emotional matter.

Mr. Cochran. Yes, sir.

Mr. Stratton. It is the same thing that Mr. Dyson is reporting.

Mr. Cochran. I can approach the remainder of my presentation any way you like. But what I would like to do is to go through some details of what I have just described in an overall fashion in order to tell you what we are doing to take care of the defense waste, that which has been generated and that which is being generated.

Mr. Dyson. Didn't you just tell us that though, that it is basically being stored on site? Isn't it treated the same way as the others?

WASTE STORAGE

Mr. Cochran. The high-level waste is being stored on site. The transuranic waste is being stored on site. The low-level waste is going to low-level disposal sites, most of which are on sites where the wastes are generated.

Mr. Dyson. So everything is on site.

Mr. Cochran. The transuranic waste, most of which is generated at the Rocky Flats site, is actually stored on the Idaho site. It is shipped and stored there temporarily.

We are building facilities to treat that waste and prepare it for storage in the Waste Isolation Pilot Plant near Carlsbad, NM. It is to be an R&D storage facility for 5 years, but we certainly hope that things work well so we can leave it there permanently.

With regard to high-level waste, again, we will be dependent on getting a repository for commercial waste.

Defense waste and byproducts management

Fiscal year 1985 authorization	$720.9
Provide construction to assure continued operations	13.4
Provide for long-term management	−42.4
First-year operation of TRU facilities (Idaho).	
Treat new Purex waste and support design of HLW immobilization facility (Hanford).	
Maintain WIPP and DWPF schedules.	
Provide hazardous chemical waste technical support.	
Escalation	+20.7
Fiscal year 1986 request	$712.8

CURRENT BUDGET ACTIVITIES

I will skip over some things, but the budget we ought to talk about. We focus first on continuing our operations. We want to support nuclear materials production and weapons production.

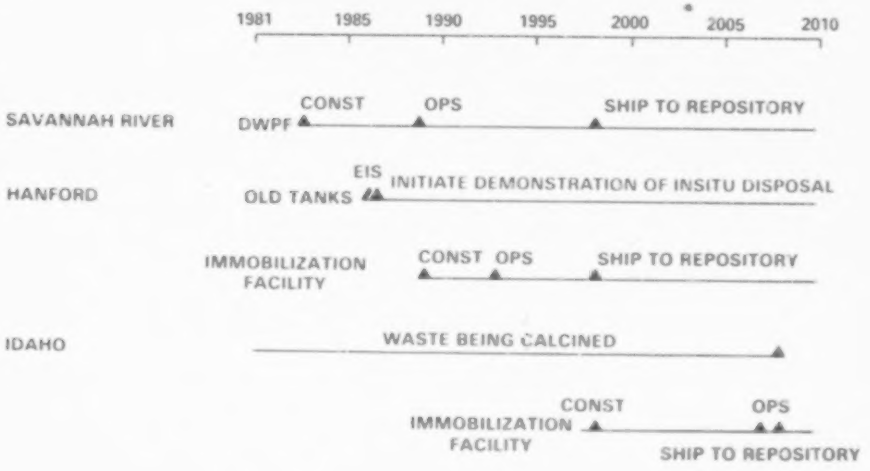
I will show you some facilities we have at Idaho where we are getting ready to process TRU waste for shipment to the Waste Isolation Pilot Plant. We also need to do some treating of the PUREX high-level waste to make that easier to handle. That is part of our requirements.

If you look at the liquid high-level waste we have, primarily at Savannah River and Richland, that is going to have to be immobilized at some point in time, so we are going to have to start thinking about some sort of immobilization facility for that waste at Richland. We certainly are going to keep moving as fast as we reasonably can with the Waste Isolation Pilot Plant, and the Defense Waste Processing Facility.

One additional area which is starting to become important now is hazardous chemical waste, and we are proposing to provide some technical support in that area to keep each site from having to reinvent the wheel. We are not proposing to pay the bill for handling the hazardous chemical waste at each site, but we would like to see some uniformity in how it is handled and see a good exchange of information on the best way to go, so not every site has to reinvent the way to handle the waste.

DEFENSE PROGRAMS
DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

MAJOR MILESTONES FOR PERMANENT DISPOSAL OF DEFENSE HIGH-LEVEL WASTE



154(1)

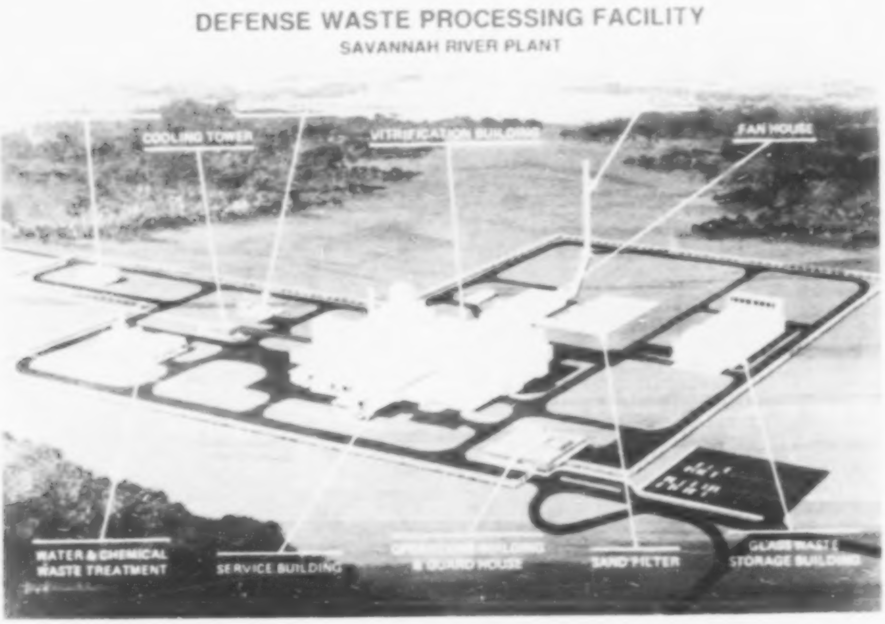
To give you some dates, and this now is for the high-level waste, we have the Defense Waste Processing Facility under construction, scheduled to come on line in the late 1980s, about 1989, and currently would expect to start shipping when a commercial repository is available.

At Hanford, we have the high-level waste stored in tanks. There are 149 old tanks and 28 new ones, some of which are still under construction. Those 149 old tanks we would like to be able to immobilize in place. Not only does it save a great deal of money on receiving and processing, but it would minimize radiation exposures. We think it may be feasible to remove the remaining free liquid and stabilize the residual.

At the moment, we are into an environmental impact statement process, looking at various alternatives. We probably will need an immobilization facility in the 1990s to put the new and recovered high-level waste into a form, probably glass, for repository disposal. Again, it may very well be the same repository that gets the Savannah River material, because it would be one of the commercial repositories.

Out in Idaho, the waste is in a different form, a dry form. It has been calcined and stored in stainless steel bins. It should be good for quite a long time, but we do need to, in the long term, consider immobilizing that and also shipping it to a repository.

These things are consistent with the Defense Waste Management Plan that has been in place for a couple of years now.

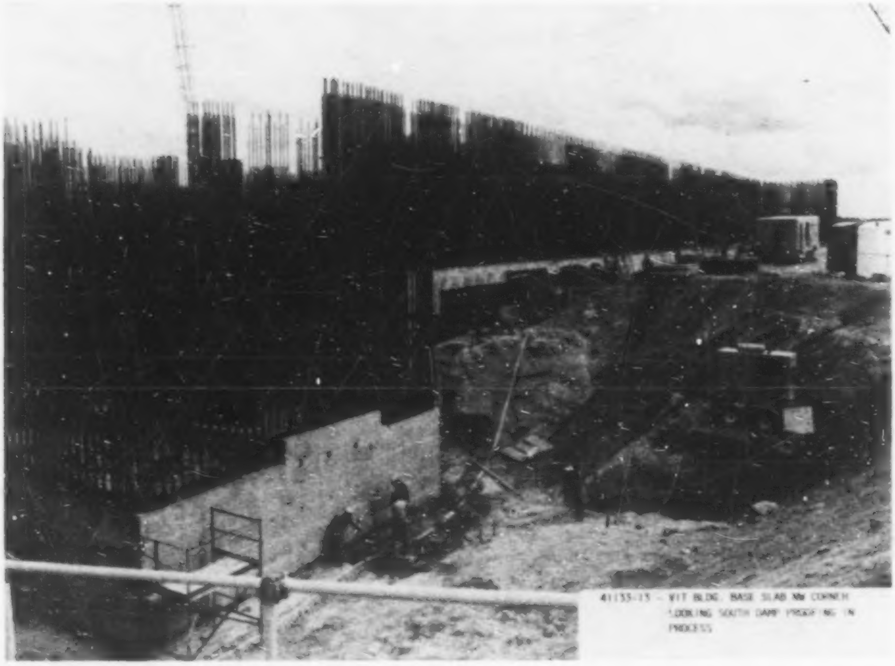

DEFENSE WASTE PROCESSING FACILITY
SAVANNAH RIVER PLANT
COOLING TOWER
VITRIFICATION BUILDING
FAN HOUSE
WATER & CHEMICAL WASTE TREATMENT
SERVICE BUILDING
OPERATIONS BUILDING & GUARD HOUSE
SAND FILTER
GLASS WASTE STORAGE BUILDING

DEFENSE WASTE PROCESSING FACILITY

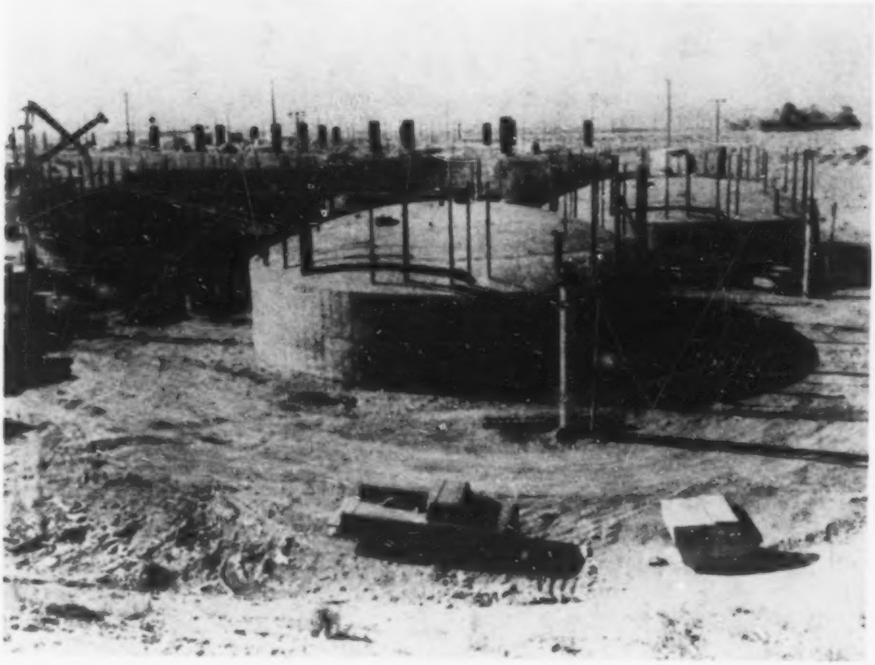
To put some pictures behind all the words, this is the artist's concept of the Defense Waste Processing Facility at Savannah River which you have been seeing for the last 2 or 3 years, I think. That is becoming a reality.

41151-4 - VIEW LOOKING NE-GENERAL SITE

This is just a long overview of the very large construction site there.


41133-13 - VIT BLDG. BASE SLAB NW CORNER
LOOKING SOUTH DAMP PROOFING IN
PROCESS

This is a close-up of some of the construction activities. This is the base pad for the vitrification facility. It is concrete, 10 feet thick. It used a lot of rebar. We got a good deal on that. That is the rebar that was going into the Clinch River plant. There is about 4,000 tons of rebar that we are using in this base pad. It is coming along quite well. We are slightly ahead of schedule—a month or so.



HIGH LEVEL WASTE TANKS

Out at Richland, we are still building some new tanks to handle that liquid waste. You first build the tank, then you fill in soil around it. This is just about half covered. If you go out to visit, all that would be visible are these penetrations. This is a monitoring well to monitor any potential leakage from the tank.

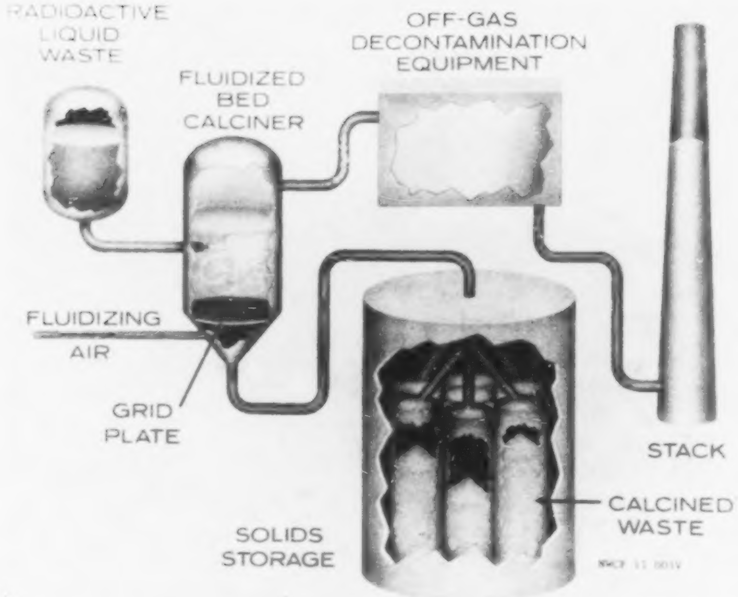
Defense Waste and Byproducts Management—Hanford Waste Vitrification Plant [HWVP]

Technical: Adapts DWPF Technology for Hanford needs: will produce about 100 canisters/year.

Schedule: Construction start about 1989; "hot" operation about 1993.

Cost: $450–500 million.

I might mention that, if we do build an immobilization facility at Hanford for the liquid waste, and if we are able to stabilize those 149 tanks in place, then we could get by with a much smaller facility that would cost maybe half what the facility at Savannah River is costing.


RADIOACTIVE LIQUID WASTE
FLUIDIZED BED CALCINER
OFF-GAS DECONTAMINATION EQUIPMENT
FLUIDIZING AIR
GRID PLATE
STACK
CALCINED WASTE
SOLIDS STORAGE

WASTE CALCINING PROCESS

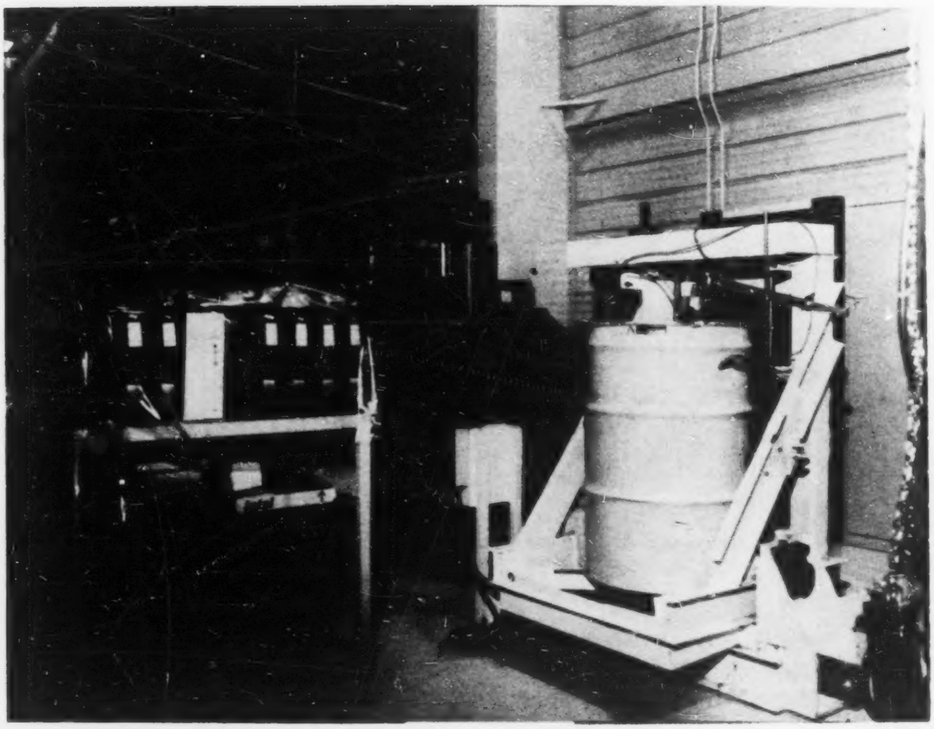
I mentioned that Idaho has dry high-level waste. This is the technical process for getting that waste. There is a new waste calcining facility which has been operating now for about 3 years. It is working very well. It worked off a backlog of 1.5 million gallons of liquid waste when it started up.

Now this is really all I have to say on high-level waste. Basically, we are storing it, and we are treating it to immobilize it to get it ready to send to a repository.

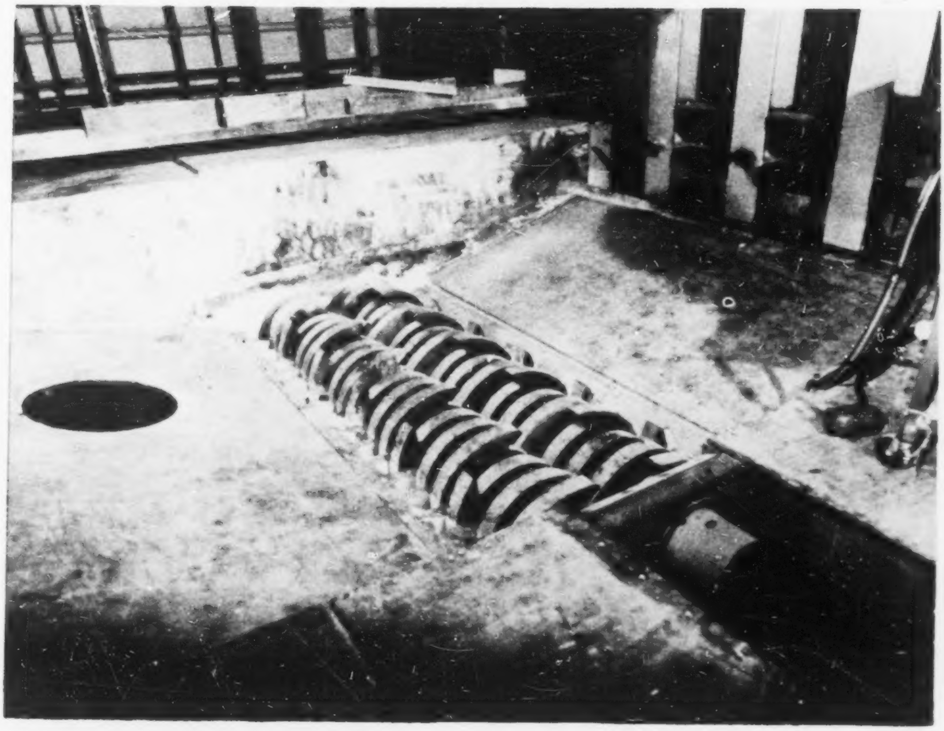
TRANSURANIC WASTE

Turning to TRU waste, this is stored on a lot of our sites, but the largest amount by far is at Idaho. This is a long-range view of the storage area on the Idaho site. If you go inside the building, you would observe that they are quite large. In fact, one of them, as far as we were able to determine, is one of the largest inflatable building in this country.

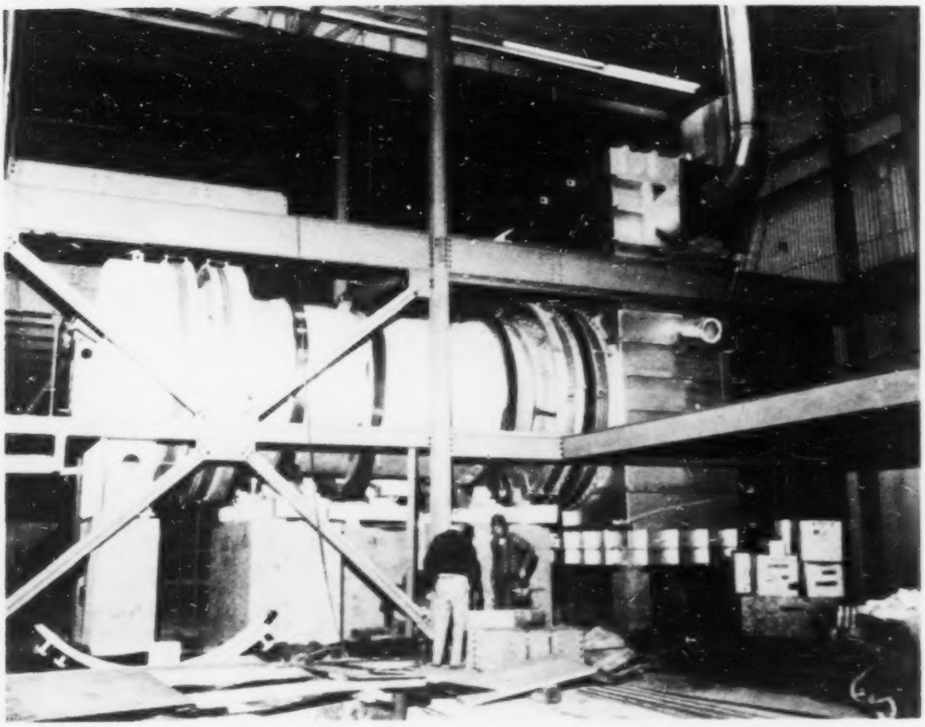
Inside you see a lot of plywood boxes and 55-gallon drums. This is TRU waste, primarily from weapons activities, and it is stored on these pads until the pads are filled. Then we remove the inflatable building, cover the stack of containers with plastic and then cover it with earth. It is retrievable because later we will want to send it to the Waste Isolation Pilot Plant. But it is in a stable form for 20-year storage.



Not all the waste we get from the fabrication activities is in a suitable form for sending to the repository, so we are building facilities to put it in suitable form. You have to go through and check what is inside the drums, liquids create problems for example. All sorts of strange things end up in those drums, so we have to have ways to check that.



Some of it has to be shredded.



And then the combustible material has to be incinerated.

WASTE ISOLATION PILOT PLANT

Then it is shipped to the WIPP in New Mexico and disposed of in the salt formation about 2,000 feet down. This is what that will look like.

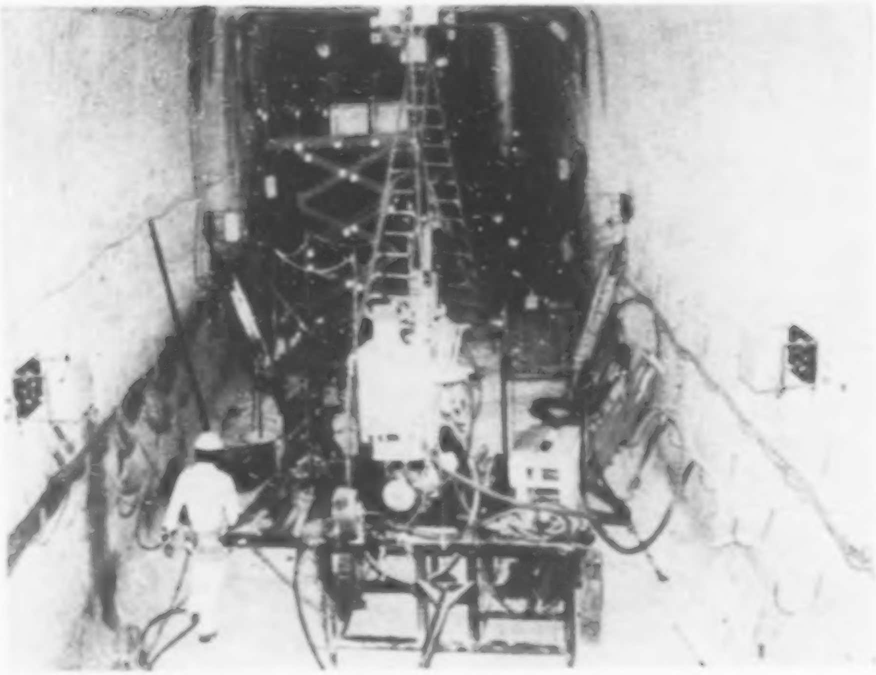
FORMATION
(SALT)

At the 2,000-foot level, a bunch of chambers like that.

Actually, construction is well along on this facility right now.

Mr. STRATTON. This is the WIPP, I guess?

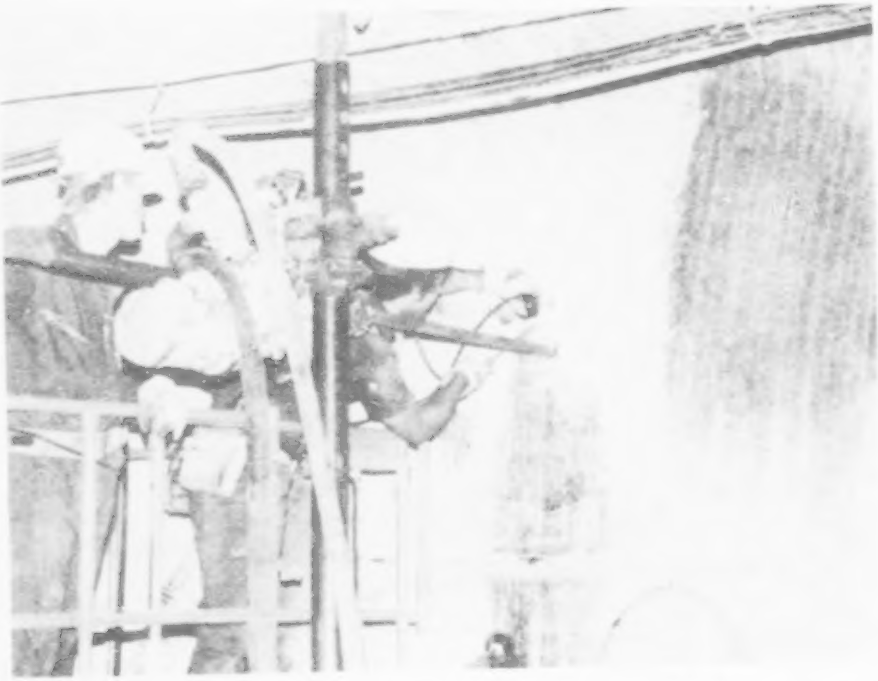
Mr. COCHRAN. Yes, sir, this is the shaft—I didn't mention it, but the underground area here is really the research and test area here.



This will be the repository area. Most of the research and test area is already mined out. They have done very, very well at moving the project along.

Mr. STRATTON. Is this going to be encased in glass?

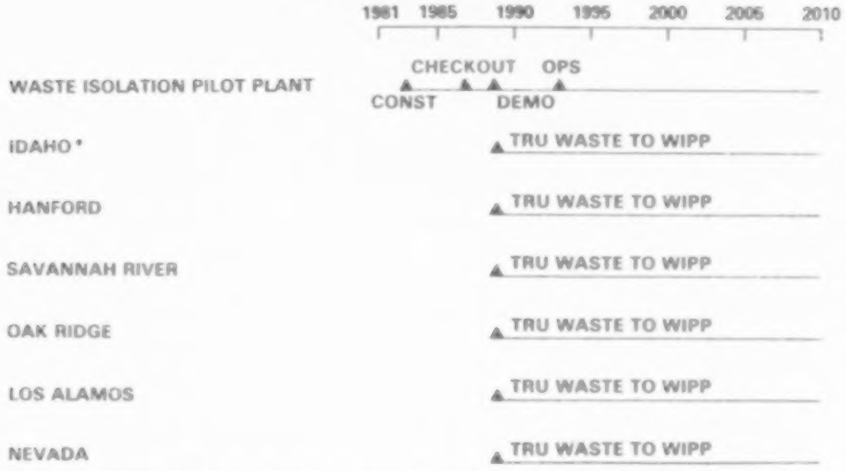
Mr. **Cochran**. No, this can remain in those 55-gallon drums I showed you earlier. It is not liquid waste. It is not anything that is going to escape from those drums. You can store it for a long time in those. This is what it will look like on the surface.



If you go down into the area, which has been mined out, you see passages which look like this. It turns out that salt is a medium that flows plastically. Over a very long period of time, these holes will actually close up. We are installing what amounts to strain gages and extensionmeters just to measure the rate and extent of movement.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

MAJOR MILESTONES FOR PERMANENT DISPOSAL OF DEFENSE TRANSURANIC WASTE



*THE NEPA PROCESS FOR SHIPMENT OF STORED INEL TRANSURANIC WASTE TO THE WIPP HAS BEEN COMPLETED

TRU 05 003

For the transuranic waste, the program outline looks very simple. We will build the waste isolation pilot plant. We are hoping then to be in a position to start shipping the TRU waste from all sites to that repository.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT—SUMMARY

Assures continued safe waste management operations in support of nuclear materials production and weapons fabrication.

Provides major steps toward permanent disposal of defense waste.

In summary, the budget we are requesting will assure safe waste management operations and will provide the major steps toward getting out of this interim storage situation into a final solution for defense waste, something we think is a very responsible step to take.

That is all I had planned to cover. I will be happy to answer any questions.

PREPARED STATEMENT OF RONALD W. COCHRAN

Mr. Chairman and Members of the Committee. It is a pleasure to present the FY 1986 budget for the Department of Energy's Nuclear Materials Program. This program is made up of two major components—materials production to meet the nation's nuclear weapons needs and defense waste management to ensure that our waste is stored or disposed of in a safe and environmentally acceptable manner.

DEFENSE PROGRAMS—NUCLEAR MATERIALS

FY 1986 BUDGET REQUEST (DOLLARS IN MILLIONS)

	FY 1985 AUTHORIZATION	FY 1986 AUTHORIZATION REQUEST
MATERIALS PRODUCTION	$1,745.0	$1,965.4
DEFENSE WASTE AND BYPRODUCTS MANAGEMENT	$ 721.6	$ 712.8
TOTAL	$2,466.6	$2,678.2

CHART 1

Chart 1 shows the Nuclear Materials' FY 1986 Authorization Request for $2.68 billion, which includes $1.97 billion for Nuclear Materials Production, and $.71 billion for Defense Waste and Byproducts Management.

I would first like to discuss the Nuclear Materials Production Program and then address the Defense Waste and Byproducts Management Program.

NUCLEAR MATERIALS PRODUCTION PROGRAM—INTRODUCTION

OBJECTIVE

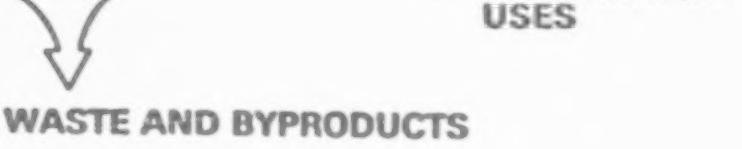


CHART 2

Chart 2 shows the objectives of the Nuclear Materials Production Program. The major objective is to provide nuclear materials for national defense requirements.

The program is also responsible for producing nuclear materials for use in government research and development, and civilian programs which use radioisotopes for research, commercial, and medical applications.

The Nuclear Materials Production Program provides materials which are essential to the development, production, and maintenance of nuclear weapons. We produce these materials in the Department's nuclear reactors and convert them into useful form in the Department's processing plants. These dedicated facilities are the sole source of tritium and plutonium in the United States to meet national defense nuclear materials requirements.

Nuclear materials requirements

The Nuclear Materials Production budget is primarily based upon the requirements for tritium, plutonium and enriched uranium set forth in the Nuclear Weapons Stockpile Memorandum (NWSM) approved annually by the President. The NWSM consists of the Nuclear Weapons Stockpile plan for the current and next 5 fiscal years (FY 1985-FY 1990), a planning projection for the subsequent 5-year period (FY 1991-FY 1995) and a long-range summary for nuclear materials planning for 5 additional years (FY 1996-FY 2000). The President annually issues a National Security Decision Directive approving the Nuclear Weapons Stockpile Plan and noting the planning projection and long-range summary as points of departure for future stockpile plans. These forecasts are based on projected military needs as well as our ability to respond to those needs.

Chart 3 [deleted] shows the total amount of plutonium and tritium expressed as the weighted sum in "plutonium equivalents," excluding decay and waste losses, needed to satisfy the projected weapons requirements. [Deleted.] Much of the plutonium and tritium required for building new warheads and replacing decay losses is obtained by reclaiming and recycling materials from retired weapons returned by the Department of Defense (DOD) to the Department of Energy (DOE). Material requirements which cannot be met from DOD returns or existing DOE inventories must be satisfied by new production. [Deleted.] We expect to meet these requirements through FY 1990, provided we have no serious problems with our production facilities or our planned production initiatives. [Deleted.]

Restarting the L Reactor at our Savannah River, South Carolina, facility and blending to utilize inventories of low-grade plutonium are the primary new contributing initiatives during the directive period. Higher productivity cores at Savannah River as well as special isotope separation technology and/or continued blending can make additional significant contributions during the planning period. [Deleted.]

Nuclear materials production rates

Chart 4 [deleted] shows the cumulative plutonium and tritium supply and demand expressed in plutonium equivalents, excluding decay and waste losses, over the 16-year planning span of the Nuclear Weapons Stockpile Memorandum based on the FY 1986 budget. [Deleted.]

Charts 5 and 6 [deleted] show the projected annual production rates by source of plutonium equivalent through the planning period. The increase in production you see here is due largely to the production initiatives started in FY 1981—efforts this committee has strongly supported. [Deleted.] Among the initiatives which can contribute to the rise in production are blending to utilize inventories of low-grade plutonium, facilities restoration, conversion of N Reactor to production of weapon-grade plutonium, reactivation of the PUREX fuel processing plant, restart of L Reactor, higher productivity cores in our Savannah River Plant reactors, and special isotope separation. Chart 5 is based on production deployment of the special isotope separation technology. Chart 6 is based on continued blending without special isotope separation. These increases in production will permit us to meet the projected requirements of the nuclear weapons program until the late 1990's [deleted]. I will discuss the materials production initiatives in more detail later.

Charts 7 and 8 [deleted] show a slightly different perspective on nuclear materials supply and demand. The top solid line represents total supply available and the dashed line represents net expected demand. [Deleted.] The other solid lines represent the cumulative contributions of the various production capabilities and illustrate the importance of keeping the initiatives on schedule. Chart 7 is based on production deployment of special isotope separation technology. Chart 8 is based on continued blending without special isotope separation.

Chart 9 [deleted] shows the relative product costs from supply options currently available or planned. In general, the incremental plutonium production which the new initiatives provide is considerably less costly than base plutonium production from the four currently operating production reactors.

Comparison of U.S. and U.S.S.R. production

Our historical annual rate of production (plutonium equivalents) is shown in Chart 10 [deleted]. When production scale activities were initiated in the 1940's, the production complex produced [deleted] plutonium equivalent per year. In the late fifties and early sixties, when we were operating up to 13 reactors, U.S. plutonium equivalent production reached a peak [deleted]. During the 1960's, many production reactors were shut down. Through the seventies, we produced less [deleted].

Highly enriched uranium

I also want to mention the supply of highly enriched uranium for U.S. weapons. The U.S. weapons program has operated within its existing inventory of enriched uranium for the last 20 years without having to obtain additional material from the uranium enrichment complex. This has been accomplished by recycling enriched uranium from retired warheads. Although recycling continues, the supply of highly enriched uranium is decreasing due to utilization in weapons tests, production reactors and research reactors. A need for additional quantities of highly enriched uranium is projected for the weapons program starting as early as FY 1988 as shown on Chart 11 [deleted]. Uranium feed required to produce the highly enriched uranium needed for Defense Programs activities can be provided from DOE's existing inventory, at least through Year 2000, through a combination of utilizing natural uranium feed and recycling partly depleted uranium "tails." It will be necessary to significantly increase the highly enriched uranium production capacity and reestablish the supporting uranium hexafluoride to uranium tetrafluoride conversion capability which can be done at a cost of approximately $30 million. This additional capacity would allow DOE to meet existing Naval Reactors program requirements as well as the projected weapons program requirements.

Production process and materials flow

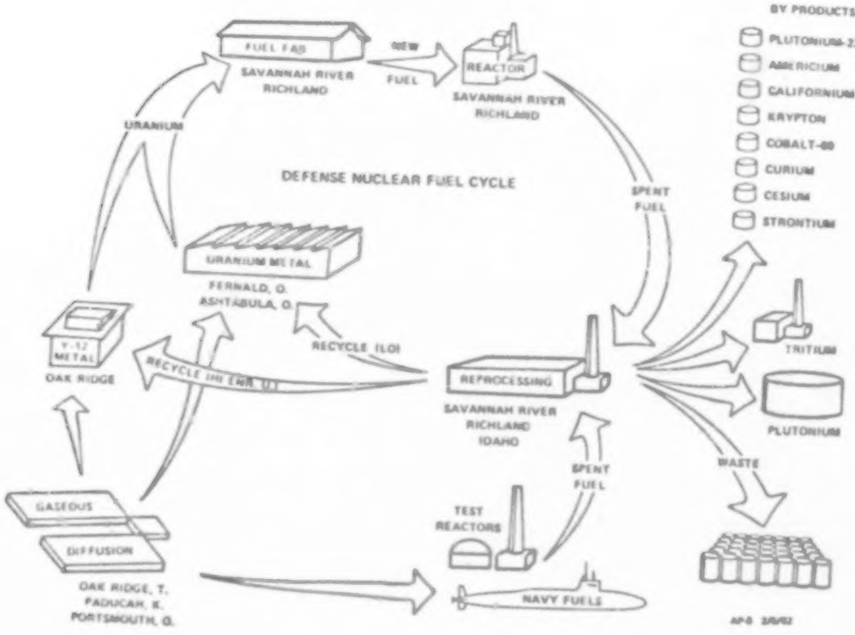

DEFENSE NUCLEAR FUEL CYCLE
FUEL FAB
SAVANNAH RIVER
RICHLAND
NEW
FUEL
REACTOR
SAVANNAH RIVER
RICHLAND
BY PRODUCTS
PLUTONIUM-238
AMERICIUM
CALIFORNIUM
KRYPTON
COBALT-60
CURIUM
CESIUM
STRONTIUM
URANIUM
SPENT
FUEL
URANIUM METAL
FERNALD, O.
ASHTABULA, O.
Y-12
METAL
OAK RIDGE
RECYCLE (LO)
RECYCLE (HI ENR. U)
REPROCESSING
SAVANNAH RIVER
RICHLAND
IDAHO
TRITIUM
PLUTONIUM
WASTE
SPENT
FUEL
TEST
REACTORS
GASEOUS
DIFFUSION
OAK RIDGE, T.
PADUCAH, K.
PORTSMOUTH, O.
NAVY FUELS
AP-8 3/6/82

CHART 12

Before I get into the details of our request, I would like to describe, using Chart 12, the DOE defense nuclear fuel cycle and its associated facilities. The gaseous diffusion plants provide uranium of the proper enrichment levels to the feed material facilities. These facilities produce uranium metal which is transported to Savannah River or Richland where it is fabricated into fuel or targets for use in the reactors.

The uranium fuel comes from four sources: (1) slightly enriched and highly enriched uranium recycled from irradiated defense production reactor fuel; (2) highly enriched uranium recovered from spent Navy and research reactor fuel at Idaho and processed into usable form at Oak Ridge; (3) highly enriched uranium stockpiled at the Oak Ridge Y-12 plant; and (4) new slightly enriched uranium obtained from the DOE enrichment plants.

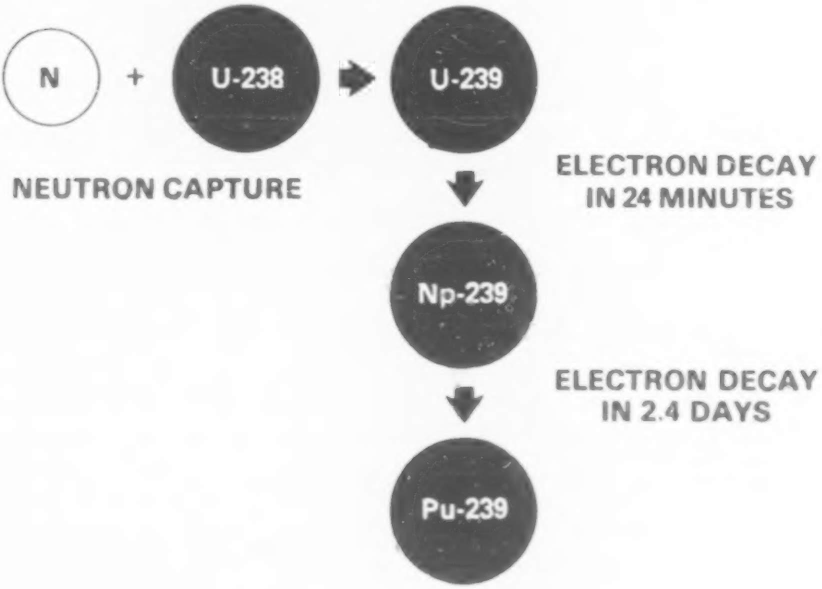


CHART 13

Our Savannah River reactors can produce both plutonium and tritium. For plutonium, the reactors use about 60 percent enriched uranium in the fuel rods to drive the reactors and irradiate depleted uranium target rods to produce plutonium. The basic nuclear process for producing plutonium-239, as shown in Chart 13, is the capture of a neutron by uranium-238 to give uranium of atomic weight 239 which, within a few days, decays by electron emission to plutonium-239.

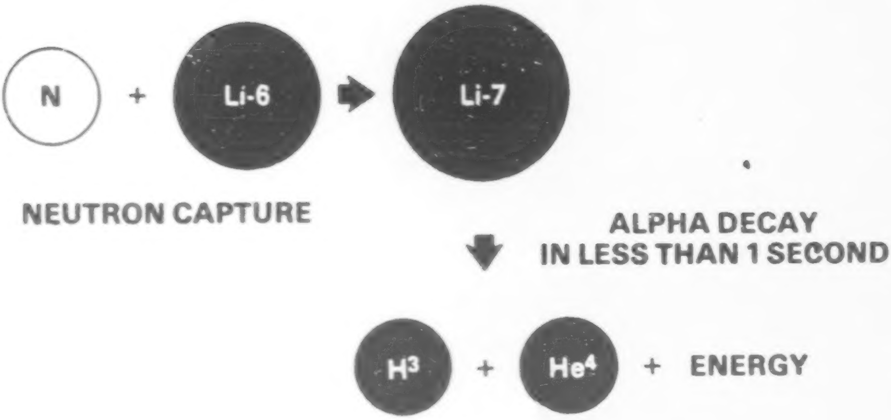


CHART 14

To produce tritium, lithium targets are irradiated, rather than depleted uranium targets. The basic nuclear process for producing tritium, (hydrogen-3), as shown in Chart 14, is the capture of a neutron by lithium-6 to form lithium-7 which decays rapidly to produce tritium and helium as byproducts. [Deleted.]

The N Reactor on the Hanford site at Richland uses about 1 percent slightly enriched uranium to fuel the reactor and produce plutonium. The spent fuel from N Reactor is processed at the PUREX fuel processing plant to recover both the produced plutonium and the remaining uranium. After being in standby since 1972, PUREX was reactivated in November 1983, 5 months ahead of schedule. We are very grateful for the strong support this Committee provided to enable us to achieve that important milestone.

Idaho receives, stores, and processes fuels principally from Navy propulsion reactors for the recovery of residual enriched uranium. The recovered uranium is used as fuel for the Savannah River reactors.

NUCLEAR MATERIALS PRODUCTION SITES

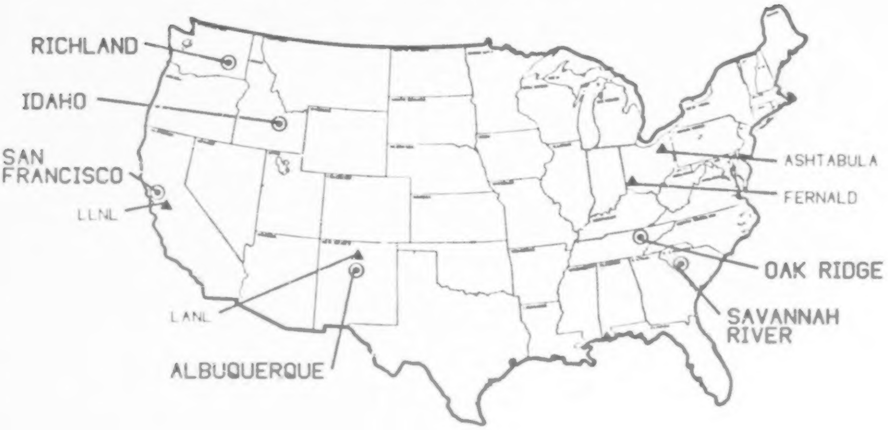


CHART 15

The material flow which I have just described involves large facilities at six field sites. These sites comprise about 1,850 square miles of land and employ about 14,600 people. These six production sites, shown in Chart 15, are located at Savannah River, South Carolina; Richland, Washington; Idaho Falls, Idaho; Oak Ridge, Tennessee; and Fernald and Ashtabula, Ohio. Lawrence Livermore National Laboratory and Los Alamos National Laboratory carry out production related research and development and material processing activities.

SUMMARY BUDGET REQUEST

Before continuing with discussion of the production activities, I would like to point out that the Nuclear Materials Production Program is providing special emphasis to two important crosscutting areas as shown in Chart 16.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET REQUEST COMMITMENTS

- **ENVIRONMENTAL IMPROVEMENTS**
- **SAFEGUARDS AND SECURITY IMPROVEMENTS**

CHART 16

Commitment to priority environmental improvements

DOE is committed to taking those actions necessary to comply with applicable State and Federal environmental regulations. In particular, compliance actions are underway to meet the requirements of the Resource Conservation and Recovery Act, the Clean Water Act, and the Comprehensive Environmental Response, Compensation and Liability Act.

It is the policy of the Department of Energy to operate the production complex in an environmentally acceptable manner while providing nuclear materials required for national defense. The FY 1986 budget request for environmental activities continues this emphasis and commitment and provides for the beginning of new long-term solutions for priority problem areas.

Commitment to safeguards and security improvements

A heightened sense of priority has been given to: (1) evaluations of the remaining security vulnerabilities at key DOE weapons and research facilities; (2) more comprehensive, integrated planning for safeguards and security activities and improvements; and (3) more effective operations of safeguards and security systems, including performance testing of such systems. This increased priority is due principally to the need for improvements identified as the result of inspections and investigations by: (1) the DOE headquarters and field offices; (2) the DOE Inspector General; (3) the General Accounting Office; and (4) various Congressional committees. The heightened sense of priority also results from the increase in the international terrorist threat to U.S. interests. Not only might such groups be interested in nuclear materials or fabricated nuclear weapons, they or their supporters might be interested in acts of sabotage against key nuclear weapons facilities to disrupt or damage the weapons production capability of the U.S.

These potential threats as well as inspections and investigations, have focused management attention on the priority need for increased funding to improve the security of key DOE facilities and to provide adequate safeguards for special nuclear materials. These cost increases are partially due to the need for tactical response forces including SWAT (Special Weapons and Tactics) teams equipped with automatic weapons, grenades, armored vehicles, helicopters, and secure communications as well as the additional well-qualified guard force personnel and more intensive, continuous training that such teams require. Additionally, we are replacing obsolete alarm system components and nuclear material measurement systems.

We continue to believe that it is essential to national security and the protection of public health and safety to improve the state of safeguards and security at our vital facilities. The safeguards and security budget for FY 1986 has been formulated as part of an agency-wide effort to maintain the momentum of previous years and to correct remaining deficiencies. Continued funding is essential in our efforts to establish continued effective safeguards and security.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET REQUEST
(DOLLARS IN MILLIONS)

	FY 1985		FY 1986 REQUEST	
	AUTH.	APPROP.	AUTH.	APPROP.
OPERATING EXPENSES				
REACTOR OPERATIONS	$ 536.2	$ 535.9	$ 586.4	$ 586.4
PROCESSING OF NUCLEAR MATERIALS	439.8	439.8	493.1	493.1
SUPPORTING SERVICES	253.0	253.0	256.6	256.6
PROGRAM DIRECTION	20.3	20.3	21.3	21.3
URANIUM ENRICHING	142.8	142.8	258.9	258.9
TOTAL OPERATING EXPENSES	$1,392.1	$1,391.8	$1,616.3	$1,616.3
CAPITAL EQUIPMENT	117.7	117.5	123.4	123.4
CONSTRUCTION	235.2	243.0	225.7	237.5
GRAND TOTAL	$1,745.0	$1,752.3	$1,965.4	$1,977.2

CHART 17

Turning now to the FY 1986 budget as shown in Chart 17, we are requesting authorization of $1,965,400,000 in support of Nuclear Materials Production activities.

NUCLEAR MATERIALS PRODUCTION
CHANGES FROM FY 1985 AUTHORIZATION (DOLLARS IN MILLIONS)

FY 1985 AUTHORIZATION	**$1,745.0**
• ESCALATION	+ 74.7
• FY 1985 BASE PROGRAM CONTINUATION INCLUDING REACTOR OPERATIONS, PROCESSING, SUPPORT FACILITIES, SAFETY, SECURITY, ENVIRONMENTAL, ETC.	− 24.4
• NUCLEAR MATERIAL PRODUCTION INITIATIVES INCLUDING – SPECIAL ISOTOPE SEPARATION – PROCESS FACILITY MODIFICATIONS – SAVANNAH RIVER FUEL IMPROVEMENTS – HIGH PRODUCTIVITY CORES – REACTOR PRODUCTION ASSURANCE ACTIVITIES	+ 23.2
• MAINTENANCE, RESTORATION, AND PRODUCTIVITY RETENTION PROJECTS	+ 24.7
• NAVAL REACTORS URANIUM REQUIREMENTS	+ 122.2
FY 1986 DEPARTMENTAL AUTHORIZATION REQUEST	**$1,965.4**

CHART 18

Chart 18 shows the major reasons for our increase in authorization over FY 1985. The majority of the increase can be attributed to escalation on our on-going activities and the [Deleted] Naval reactor uranium requirements, which I will discuss in more detail later.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET REQUEST HIGHLIGHTS

- CONTINUES CURRENT PRODUCTION BASE ACTIVITIES IN FY 1986
- SUPPORTS PRODUCTION INITIATIVES BEGUN IN PREVIOUS YEARS
  - FUNDS FACILITY RESTORATION AND IDAHO RESTORATION PROGRAMS
  - FUNDS L REACTOR OPERATION AT SAVANNAH RIVER
  - CONTINUES HIGH PRODUCTIVITY CORE ACTIVITIES
  - CONTINUES SPECIAL ISOTOPE SEPARATION DEVELOPMENT PROGRAM
  - CONTINUES REACTOR PRODUCTION ASSURANCE ACTIVITIES
- FUNDS URANIUM ENRICHING SERVICES TO MEET MATERIALS PRODUCTION AND NAVAL REACTORS REQUIREMENTS AND A 3 MONTH WORKING INVENTORY OF SEPARATIVE WORK
- FUNDS ACTIVITIES NECESSARY TO MITIGATE SECURITY AND ENVIRONMENTAL CONCERNS

CHART 19

The highlights of our FY 1986 request are shown in Chart 19.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET SUMMARY
(DOLLARS IN MILLIONS)

	FY 1985		FY 1986 REQUEST	
	AUTH.	APPROP.	AUTH.	APPROP.
BASE ACTIVITIES				
CURRENT OPERATIONS	$1,231.0	$1,217.4	$1,267.3	$1,286.8
L REACTOR	43.3	43.3	60.7	60.7
SECURITY	142.4	138.0	127.8	139.8
SUBTOTAL	$1,416.7	$1,398.7	$1,455.8	$1,487.3
PRODUCTION INITIATIVES				
RESTORATION	$ 78.9	$ 82.9	$ 51.7	$ 47.7
IDAHO RESTORATION	15.5	15.5	20.1	20.1
PRODUCTIVITY RETENTION	0.0	0.0	28.2	28.2
REACTOR SAFETY	25.0	36.3	23.1	24.9
HIGH PRODUCTIVITY CORES	0.9	0.9	12.0	12.0
SPECIAL ISOTOPE SEPARATION	69.0	69.0	80.0	80.0
PROCESS FACILITY MODIFICATIONS	9.5	19.5	39.2	21.7
NPR/REACTOR PROD ASSURANCE	8.5	8.5	6.1	6.1
SUBTOTAL	$207.3	$232.6	$248.9	$240.7
OTHER				
NAVAL REACTOR SUPPORT	$ 121.0	$ 121.0	$ 249.2	$ 249.2
TOTAL MATERIALS PRODUCTION	$1,745.0	$1,752.3	$1,965.4	$1,977.2

CHART 20

Chart 20 shows a crosscut of our budget request broken down into Base Activities, Production Initiatives, and Naval Reactor support. I will now address each in detail.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET REQUEST
BASE ACTIVITIES

- **CURRENT OPERATIONS**
  - 3 REACTORS, 2 CHEMICAL PROCESSING CANYONS AT SAVANNAH RIVER
  - N REACTOR AT RICHLAND
  - CHEMICAL PROCESSING PLANT AND FLUORINEL DISSOLUTION AND STORAGE FACILITY AT IDAHO
  - FEED PRODUCTION PLANTS AT FERNALD AND ASHTABULA, OHIO, AND OAK RIDGE, TENNESSE
  - BLENDING
  - PUREX FUEL PROCESSING PLANT
  - ENVIRONMENTAL PROTECTION
- **L REACTOR**
- **SECURITY**

CHART 21

The major component of our request is for base activities as shown in Chart 21, which include facilities currently scheduled to be operating for the production of nuclear materials as contrasted to initiatives which will increase materials production capacity and assure long-term operations of the Materials Production complex. Of the authorization amount, $1,455,800,000 is needed to support base activities in FY 1986.

Current operations

Meeting the objectives of the program requires operation of the four Savannah River reactors to produce tritium and high-purity plutonium for blending; operation of the Richland N Reactor to produce weapon-grade plutonium; operation of two chemical processing facilities at Savannah River, one at Richland, and one at Idaho; operation of reactor feed materials and fuel fabrication facilities at Fernald, Ashtabula, Oak Ridge, Richland, and Savannah River; ongoing security and environmental protection improvements; ongoing process development activities; and operation of utilities and other site support facilities. The base program also supports processing of the Naval and research and development reactor spent fuel returned to Idaho, recovery and processing of scrap nuclear materials to supplement new production, and supporting other Department, government, and industry requirements. Considerable funding is required for maintenance and equipment replacement needed to operate these aging facilities in a safe, secure, efficient and environmentally-acceptable manner.

In FY 1986, the new spent fuel receiving and dissolution processing facility at Idaho will begin full-production processing of irradiated fuels. Subsequently, the recovered uranium from this process will be returned to Oak Ridge to meet defense program needs.

In addition to the production of weapon-grade plutonium directly in reactors, weapon-grade plutonium can be made available by blending high purity plutonium with lower grade—fuel-grade—plutonium. Although the Richland N Reactor is now operating to produce weapon-grade plutonium, during much of the time when the PUREX fuel processing plant was on standby, N Reactor was operated to produce fuel-grade plutonium. This stored material is now being processed and the plutonium obtained is being blended with high purity plutonium currently being produced at the Savannah River Plant to increase the supply of weapon-grade plutonium. Not all of the PUREX capacity is required to provide fuel grade plutonium for blending at the Savannah River Plant. PUREX is also processing fuel containing weapon-grade plutonium which is currently being produced in N Reactor. The combined fuel-grade processing for blending at the Savannah River Plant and weapon-grade processing for direct use at Rocky Flats maximizes the total plutonium production for Defense Programs.

[Deleted.]

The funding request for PUREX is higher in FY 1986 than FY 1985 because of increased material throughput. In FY 1986, both fuel-grade and weapon-grade plutonium will be processed. [Deleted] plutonium will be processed in PUREX during FY 1986 than during FY 1985. The processing of the stored backlog of spent N Reactor fuel is planned to be completed by the end of the 1980's.

To enhance and broden the nuclear materials production capability in the near term, the Department is considering restarting the 175 megawatt Engineering Test Reactor (ETR) at the Idaho National Engineering Laboratory for the production of isotopes for special defense applications. The ETR has been in standby condition since 1981. Restarting the ETR could supplement reactor production capacity at Savannah River and Richland for defense nuclear materials, particularly small quantities needed for special applications.

In FY 1986, we plan to continue the environmental work required at nuclear materials production sites. Additional emphasis will also be placed on programs to prevent future contamination of the environment.

The FY 1986 request provides funds for environmental activities at the Savannah River Plant including: (1) elimination of the potential for future contamination of ground and surface waters from radioactive and hazardous industrial waste discharges; (2) expanded monitoring, evaluation and cleanup of ground water contamination; (3) engineering studies on deactivating and decontaminating the chemical separations area seepage basins; and (4) thermal mitigation of reactor cooling water discharges. These activities are consistent with the Groundwater Protection Plan for the Savannah River Plant, which was submitted to the Congress in FY 1984 pursuant to Public Law 98-181.

Activities to be funded will include completion of the ongoing comprehensive study of the environmental effects of Savannah River Plant cooling water discharges and withdrawals as well as the evaluation of alternative cooling methodologies. Conceptual designs for facilities to mitigate reactor cooling water thermal effluents will also be evaluated.

In order to retire and decommission the Savannah River Chemical Separations Area seepage basins and eliminate future groundwater contamination problems, the request includes an FY 1986 project for construction of an effluent treatment facility to treat radioactive and hazardous discharges.

L Reactor

Our FY 1986 request includes funding for operating L Reactor at the Savannah River Plant. The program to upgrade L Reactor was initiated in FY 1981 and reactor renovation was completed in October 1983, on schedule. This reactor is currently scheduled to begin operating in September 1985 following construction of a lake to mitigate thermal discharges from the reactor.

[Deleted.] It is extremely important to restart L Reactor and bring it to full operation as soon as feasible.

Security

In FY 1986 we plan to continue priority security improvements to address needs identified by recent Departmental assessments. Emphasis will include improvements to: (1) the detection and deterrence capabilities against both insider and outsider threats; (2) our ability to respond to acts of sabotage, terrorism, theft, or other disruptive acts; (3) equipment and instrumentation; and (4) personnel training.

Continuing security projects funded in FY 1986 include: (1) a computerized nuclear-material vault system at Richland, Washington; (2) a security systems upgrade at Idaho; and (3) a project at Savannah River aimed at eliminating site-wide security deficiencies. New in FY 1986 is funding for the construction of a central alarm, control and communication system at the Savannah River Plant. [Deleted.]

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET REQUEST
PRODUCTION INITIATIVES

- **RESTORATION PROGRAM**
- **IDAHO RESTORATION**
- **PRODUCTIVITY RETENTION**
- **REACTOR SAFETY**
- **HIGH PRODUCTIVITY CORES**
- **SPECIAL ISOTOPE SEPARATION**
- **PROCESS FACILITY MODIFICATIONS**
- **REACTOR PRODUCTION ASSURANCE ACTIVITIES**

CHART 22

The Production Initiatives are listed in Chart 22.

Restoration program

The facilities restoration program is in the sixth year of a seven-year funding schedule. This program includes the highest priority items to restore the production capability of much of the complex which diminished during the 1970's. Your continued support of the restoration program is vital since we cannot achieve our production goals without a reliable, fully-functioning production complex.

Design and construction efforts are proceeding satisfactorily at all four sites and many of the subprojects funded early in the program have already been completed. The last restoration subproject is expected to be completed by September 1988.

Our authorization request of $51,700,000 will allow those subprojects already underway to be continued.

Idaho restoration

Facilities at the Idaho site are not included in our Restoration Program. However, spent fuel returns from the Navy are scheduled to double by 1992 and continue increasing through the year 2000. Our requested funding for FY 1986 will allow the continuation of the design work begun this year and the initiation of procurement and construction activities. The Idaho restoration project is required to increase capacity and ensure reliability sufficient to process the scheduled fuel returns. The enriched uranium recovered at Idaho is cost beneficial to the operation of the Savannah River production reactors since it greatly reduces the amount of new highly enriched uranium required.

Productivity retention

Our FY 1986 request includes $28,200,000 to initiate a new construction line item—the Productivity Retention Project—to further improve and sustain the high operating availability and efficiency of the production facilities at Savannah River, South Carolina; Richland, Washington; and Fernald, Ohio.

Materials throughput rates at these three plants have more than doubled over the past 5 years as the result of increased production demands. This greater throughput has caused many older components and systems to reach the end of operational life with resulting increases in downtime and higher operating expenses. If future nuclear materials requirements are to be achieved in a cost effective manner, a relatively broad program must be undertaken to forestall equipment failures, reduce the excess maintenance times that are keeping needed units off-line, and replace out-moded inefficient components.

The total cost of these required productivity improvements will be $550 million. Work will be done in five separate phases with the content of each phase established by schedule urgency. Phase I, which is being introduced in FY 1986, consists of 12 subprojects costing $210.5 million.

While all 12 subprojects cannot be covered in the time available today, I would like to briefly discuss 2 of the subprojects to be performed to illustrate the scope of the project.

The first of these is replacement of the thermal diffusion columns at Savannah River. The thermal diffusion columns are used to purify tritium which has been extracted from reactor targets [deleted]. Usable parts have been taken from the broken units in an attempt to keep the remaining columns in service. [Deleted.]

We are proposing to replace this obsolete equipment with a newly developed thermal absorption cycle process. This new process will cost $3.8 million less to construct than an identical replacement, require less space, provide higher capacity, reduce tritium losses to the environment, and improve product purity.

A second representative task is refurbishment of the N Reactor V-11 control valves at Richland. A total of 1003 of these valves are used in the reactor to throttle coolant flow during fuel charging and discharging. The valve discs have become badly pitted as the result of over 20 years of service and are eroded completely through on the edges where they are exposed to the greatest hydraulic force. Larger pieces of the disc will begin to break off in the near future. These pieces will be carried downstream and are likely to become lodged in a flow monitoring venturi or fuel element. Either will cause the reactor to shut down with resulting losses of production and steam revenue.

Reactor safety

Authorization of $23,100,000 is being requested to continue activities begun in FY 1981 to enhance the operating safety of our production reactors at Savannah River and Richland. Our objective is to reduce the risk of accidents, enhance safe operations, and improve our capability to manage emergency conditions. The requested funding will be used to: train reactor operators through computer simulation of normal and off-normal reactor operations; conduct nondestructive tests of reactor internals; improve computerization and reactor coolant instrumentation; and conduct engineering safety studies. The reactor safety project also provides for remote control systems and reactor control room habitability modifications.

High productivity cores

An enriched/normal test charge (Mark 22S/25) will be fabricated in FY 1986 for irradiation in FY 1987. If successful, the Mark 22S/25 has the potential for increasing the level of plutonium equivalent production [deleted] over the current Mark 16/31 mode of production in the Savannah River reactors. In addition, the new lattice offers some further safety advantages over the current Mark 16/31 mixed lattice. This is a lower cost alternative to the previous Mark 15 program that we had requested in prior budgets.

Special isotope separation [SIS]

The FY 1986 budget provides $80,000,000 in authorization for continued engineering development of the Atomic Vapor Laser Isotope Separation (AVLIS) process at the Lawrence Livermore National Laboratory. This request will also provide for continuation of the conceptual design of the support processing facilities and equipment needed for an AVLIS production capability at the Hanford site. The request will enable the Lawrence Livermore National Laboratory to continue engineering development of plant laser and separator systems directed toward the demonstration of [deleted] plutonium separations in FY 1987. Additionally, the funding request will provide for continuation of the design, fabrication and testing of a prototypical multipod "cold" separator system at the Hanford site, including remote handling and transport equipment. This will allow a longer period for AVLIS process development while maintaining the option to initiate construction of an SIS production facility at Hanford in FY 1987 to achieve a production capability in the early 1990's.

Process facility modifications

The Process Facility Modifications Project at the Hanford site will add to the existing PUREX fuel processing facility the capability for processing and recovering plutonium from DOE-owned fuels, e.g., Fast Flux Test Facility (FFTF) fuel. In addition, we propose to increase the initial scope so the project will provide the capability to process Richland's N Reactor spent fuel in a more cost effective manner than in the existing headed portion of PUREX. By 1990, FFTF spent fuel containing plutonium with a replacement value to Defense Programs of over $1 billion will be available for processing. Payback of the capital and operating costs will occur in 1 to 2 years, depending on the facility's operating modes.

Reactor production assurance/new production reactor [NPR]

The need for new or replacement materials production capability has been the subject of various studies beginning in 1980. The earliest study, performed under the auspices of the National Security Council in 1980, concluded that at least one new production reactor would be required in the 1990's to assure a reliable supply of defense nuclear materials vital to maintaining stockpile effectiveness. This same basic conclusion has been reached in several follow-on studies and review panel reports on the need for assuring continued reliable nuclear materials production capability.

Since August 1983 the DOE has been conducting studies to evaluate various alternatives. The focus of these studies has been on a New Production Reactor (NPR) with consideration of three principal large reactor concepts (the Heavy Water Reactor, the Special Water Reactor, and the High Temperature Gas-Cooled Reactor) and three candidate sites (the Savannah River Plant, the Hanford site, and the Idaho National Engineering Laboratory). The study areas include safety, environment, status of technology, and costs.

In 1983 the DOE announced that an NPR was needed in the 1990's to assure an uninterrupted supply of tritium and that a reactor concept and site selection recommendation would be developed by 1985 following preparation of an Environmental Impact Statement. However, as a result of our continuing assessments of the options for assuring our capability to fulfill the long-term requirements for producing nuclear materials, a revised strategy is being developed to assure a reliable multi-decade capability for the production of defense nuclear materials. This strategy will be based on a renovation/replacement campaign focused on time-phased, site-unique actions to achieve assured material production well into the next century. It is expected that it will include renovation or replacement of the N Reactor at Hanford on approximately the schedule contemplated for the NPR, the subsequent replacement of a production reactor at the Savannah River Plant, and other initiatives to assure flexibility in meeting future requirements for defense materials.

Program activities for FY 1985 and FY 1986 will include: completion of the ongoing studies on large new production reactor concepts; study of other options to assure future availability of defense nuclear materials; development of a reactor production assurance strategy for each site; and planning activities leading to a decision on whether to prepare proposals for each major element of the site strategy including essential National Environment Policy Act activities.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET REQUEST

NAVAL REACTOR SUPPORT

- **PROCURE SEPARATIVE WORK FOR ENRICHING URANIUM FOR NAVAL REACTOR PROGRAM**
- **PROVIDE 3-MONTH WORKING INVENTORY OF SEPARATIVE WORK**

The Nuclear Materials Production program budgets for the separative work to produce highly enriched uranium from the Department's gaseous diffusion complex for the Naval Reactors program as shown in Chart 23. In FY 1986, we will require [deleted] Uranium-235 for the Naval Reactors program. This highly enriched uranium will be used for fabrication of naval propulsion reactor cores. It will also be used to begin naval fuel production in the new facility at Savannah River in FY 1986.

This includes process qualification runs and the establishment of work-in-process and finished fuel inventories. Additionally, the FY 1986 request provides for a 3-month working inventory of separative work. This working inventory level will assure an uninterrupted supply of uranium to the Naval Reactors program. The total Naval Reactor support authorization request is $249,200,000.

NUCLEAR MATERIALS PRODUCTION
FY 1986 BUDGET REQUEST

SUMMARY OF PLANNED ACTIVITIES

NUCLEAR MATERIALS PRODUCTION PLANS TO CONTINUE:

- **THE BASE PRODUCTION ACTIVITIES ONGOING IN FY 1985**
- **TO SUPPLY ENRICHED URANIUM FOR NAVAL REACTORS**
- **SAFETY, SECURITY AND ENVIRONMENTAL IMPROVEMENTS**
- **RESTORATION PROGRAMS AT FIVE SITES**
- **THE PRODUCTIVITY RETENTION PROGRAM**
- **REACTOR SAFETY ON AN ONGOING BASIS**
- **THE SPECIAL ISOTOPE SEPARATION DEVELOPMENT PROGRAM**
- **REACTOR PRODUCTION ASSURANCE ACTIVITIES**

In summary, the major elements of our proposed FY 1986 Nuclear Materials Production budget are directed towards meeting the Nuclear Weapons Stockpile Memorandum requirements and achieving safe, secure, and environmentally acceptable operations of our Nuclear Materials Production complex. A recap of our plans is shown on Chart 24.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT PROGRAM—INTRODUCTION

Objective

The Defense Waste and Byproducts Management (DWBM) Program principal objective is to provide essential support for production of nuclear materials and weapons by safe and environmentally responsible management of radioactive wastes.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

RADIOACTIVE WASTE TYPES

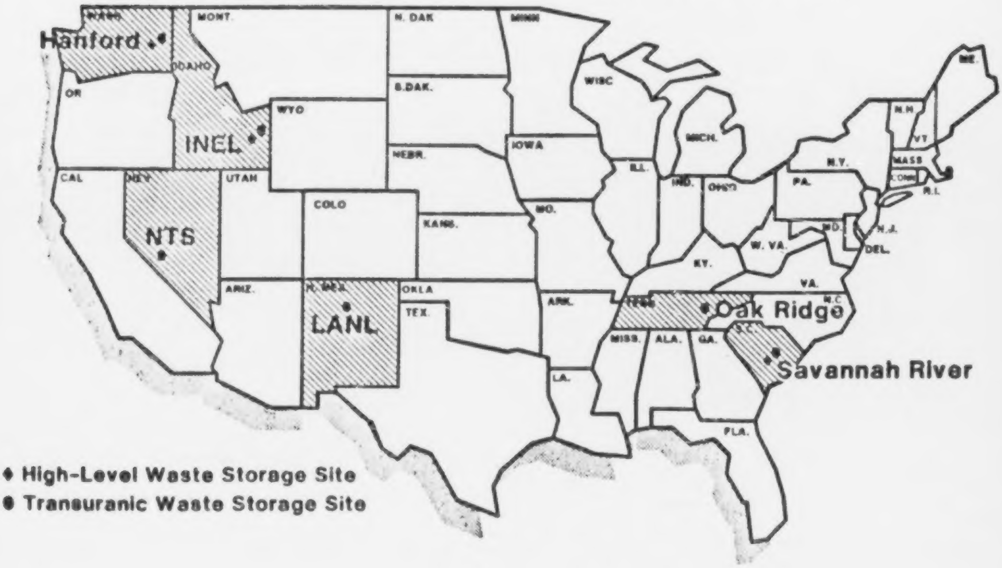
HIGH-LEVEL WASTE:	WASTE FROM REPROCESSING CHARACTERIZED BY HIGH HEAT AND LONG LASTING HAZARD.
TRANSURANIC WASTE:	LOW-LEVEL WASTE CONTAMINATED WITH CERTAIN LONG-LIVED ALPHA ACTIVITY IN EXCESS OF 100 nCi/g.
LOW-LEVEL WASTE:	OTHER WASTE CONTAMINATED WITH SHORT-LIVED RADIOACTIVITY. INCLUDES CONTAMINATED EQUIPMENT, COMPONENTS, CLOTHING, TRASH, SLUDGES, ETC.

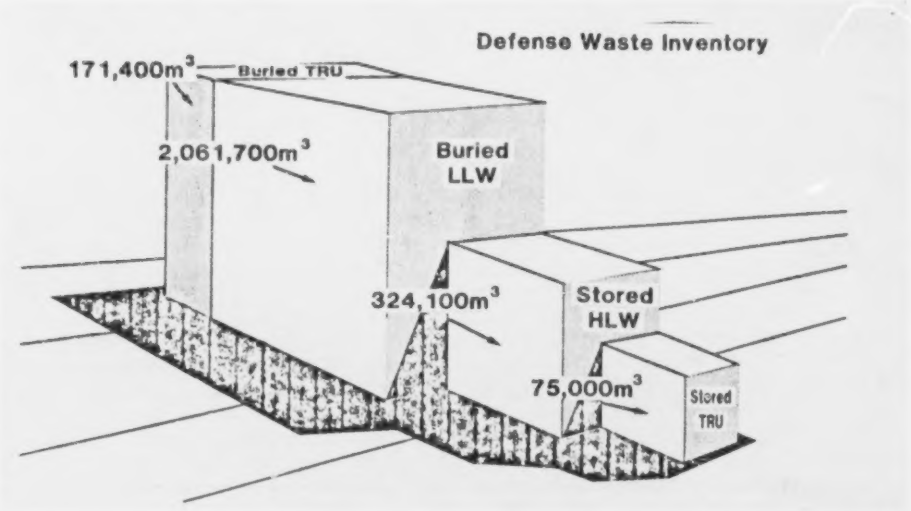
Chart 25

These wastes are primarily of three types—high-level, transuranic, and low-level as described in Chart 25—and are generated primarily by Department of Energy (DOE) defense activities, the nuclear Navy, and other DOE research and development work. The DWBM Program includes the development of technologies and operation of facilities to store, process, or dispose of these wastes. The program also emphasizes providing cost-effective techniques for managing hazardous chemical waste at our defense sites to meet environmental standards.

Our goal is to manage defense wastes routinely, safely, and cost-effectively. This goal includes the disposal of the backlog of stored defense nuclear waste located at the sites shown on Chart 26.

HIGH-LEVEL WASTE AND TRANSURANIC WASTE STORAGE SITES


Hanford
INEL
NTS
LANL
Oak Ridge
Savannah River
WASH.
MONT.
N. DAK
MINN
OR
IDAHO
S.DAK.
WISC
WYO
MICH.
ME.
N.H.
VT
MASS
CONN
R.I.
N.Y.
NEBR.
IOWA
ILL.
IND.
OHIO
PA.
N.J.
DEL.
MD.
CAL
NEV.
UTAH
COLO
KANS.
MO.
KY.
W. VA.
VA.
N.C.
S.C.
TENN.
ARIZ.
N. MEX.
OKLA
TEX.
ARK.
MISS.
ALA.
GA.
LA.
FLA.
♦ High-Level Waste Storage Site
● Transuranic Waste Storage Site



The next chart (Chart 27) shows the volume of waste that has been generated from almost 40 years of nuclear material production activities. Although we are generating increasing quantities of high-level waste (HLW), our inventory by volume—and therefore our need for storage facilities—remains relatively constant due to waste concentration efforts. However, production activities are adding about 5,500 cubic meters of transuranic (TRU) waste and 90,000 cubic meters of low-level waste (LLW) each year.

DEFENSE WASTE PROGRAM INVESTMENT STRATEGY

- OPERATE WASTE FACILITIES SAFELY TO SUPPORT MATERIALS PRODUCTION, WEAPONS FABRICATION, AND NAVAL PROPULSION
- RESTORE WASTE PROCESSING AND STORAGE FACILITIES AND PURSUE SYSTEM IMPROVEMENTS
- PURSUE GEOLOGIC DISPOSAL OF PROPERLY PREPARED WASTES AS A REPLACEMENT FOR INTERIM STORAGE

Our investment strategy is shown in Chart 28. We will continue to manage waste produced and now stored at DOE sites, making the necessary improvements to ensure those operations are conducted safely while pursuing the technologies and processes to prepare waste for final disposal. Our FY 1986 budget request fully supports this strategy. A new DOE order on radioactive waste management has been issued which provides policy and guidelines for managing radioactive waste, waste byproducts, and radioactively contaminated surplus facilities. The order is intended to provide assurance that waste from DOE defense and research and development activities is managed in a safe and environmentally acceptable manner. In addition, at the Idaho National Engineering Laboratory (INEL) and the Hanford site, where we have a security responsibility by virtue of our landlord role, we are making improvements necessary to meet DOE requirements for protection of DOE facilities.

In June 1983, the President submitted to you the Defense Waste Management Plan which reflected our plans at that time for permanent disposal of HLW and TRU waste. Our FY 1986 program continues to make progress in implementing that Plan. The major portions of that Plan, including construction of: (1) the first immobilization facility for HLW, the Defense Waste Processing Facility (DWPF) at the Savannah River Plant; (2) facilities to process TRU waste at INEL; and (3) the Waste Isolation Pilot Plant (WIPP), have all been supported in prior years and are actually on the down-side of the funding curves for these key facilities. We are beginning to address similar facilities at other sites, ensuring technology transfer and that we are cost-effectively addressing the unique characteristics of defense waste at these sites. Although the schedules for these sites are running somewhat later than the schedules reflected in the Defense Waste Management Plan, we feel it is the proper pace given our technical understanding, the environmental safety of our current storage systems, and our budget priorities. I will talk more about our specific plans in just a moment.

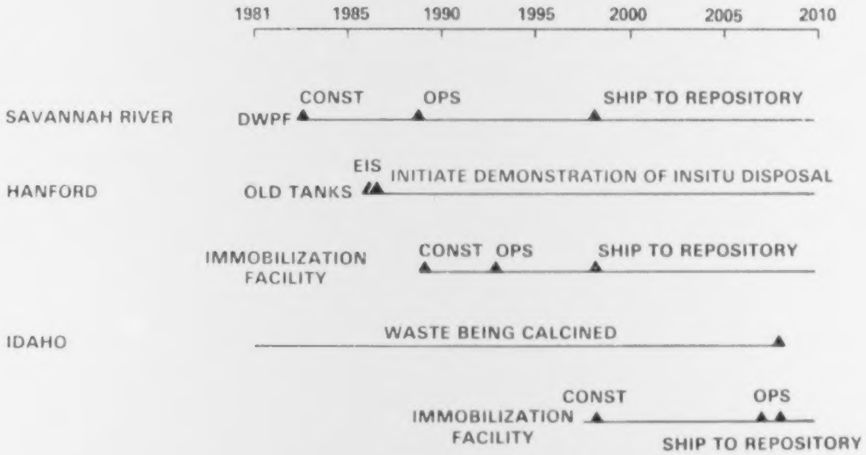
MAJOR PROGRAM ACTIVITIES

High-level waste

High-level waste is, in general, the unavoidable, highly radioactive liquid waste byproduct of plutonium production and enriched uranium recovery operations at the Savannah River Plant, INEL, and the Hanford site. Our objective is to end the environmental concern associated with interim storage of HLW in tanks and bins and achieve permanent disposal by immobilizing and preparing HLW for shipment to, and permanent disposal, in a geologic repository. Our schedule for accomplishing this task is shown on Chart 29.

We are right on schedule with construction of the DWPF at the Savannah River Plant. Construction began in October 1983, and hot operations are planned for September 1989. At the Hanford site, we have delayed our schedule about 3 years in order to assure that we have an adequate technical basis for our actions and to reflect budget priorities. A key milestone in our plans for Hanford will be completion of the Environmental Impact Statement which will hopefully allow us to continue with the reference schedule outlined on Chart 29.

MAJOR MILESTONES FOR PERMANENT DISPOSAL OF DEFENSE HIGH-LEVEL WASTE



As indicated in the chart we hope to dispose of the old single-shell tanks in-place, provided the analysis being conducted will support that option. We expect to design an immobilization plant at the Hanford Reservation, building on our experience with the DWPF, and begin construction in FY 1989. In FY 1986 our efforts will focus on planning, process and equipment engineering, and conceptual design to optimize the economics, safety, and reliability of that facility. The INEL continues to store its calcined waste in stainless steel bins. Since waste in this solid form is exceptionally stable, we will continue this approach pending its ultimate disposal from that site in the early part of the twenty-first century.

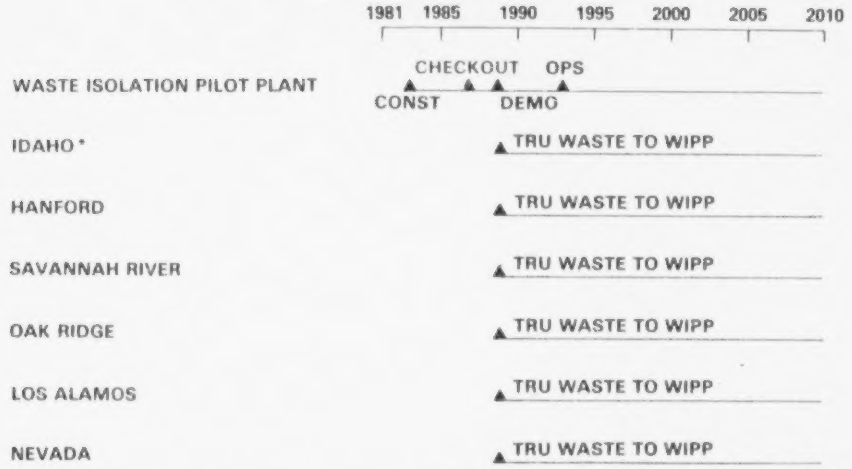
The Nuclear Waste Policy Act of 1982, Public Law 97-425, directed the President to evaluate, by January 1985, the use of commercial waste disposal capacity for the disposal of defense HLW. That evaluation has shown, taking into account all the factors specified for the evaluation, there is no compelling basis to require disposal of defense HLW in a separate defense repository. Therefore, the Department is proceeding with arrangements to dispose of defense waste in the same repository used for commercial waste. This will include payment to the Nuclear Waste Fund for our defense waste analogous to payment from utilities for their commercial waste. We are beginning negotiations on a payment plan. However, we have not included funding for these payments in our FY 1986 budget.

Transuranic waste

Transuranic waste contains the long-lived, radioactive elements beyond uranium in the periodic table. The principal element in such waste is plutonium. The objective of the Plan with regard to TRU waste is to end interim storage and begin permanent disposal. Newly generated and stored defense TRU waste will be certified, or processed and certified, for compliance with the WIPP Waste Acceptance Criteria and sent to the WIPP in New Mexico. After a 5 year demonstration period, a decision will be made to leave or retrieve the TRU waste. The demonstration period will focus on those issues for which the State of New Mexico has requested more definition and on development of a more comprehensive understanding of the phenomena involved. Our schedule for shipment of defense TRU waste to WIPP is shown on Chart 30. We are continuing our efforts leading toward waste certification which will begin in late FY 1985 or early FY 1986.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

MAJOR MILESTONES FOR PERMANENT DISPOSAL OF DEFENSE TRANSURANIC WASTE



*THE NEPA PROCESS FOR SHIPMENT OF STORED INEL TRANSURANIC WASTE TO THE WIPP HAS BEEN COMPLETED

Chart 30

Our pilot facilities at INEL are continuing on schedule and within cost estimates. The Stored Waste Examination Pilot Plant (SWEPP) facility will begin examining stored waste in FY 1986, and the Processing Experimental Pilot Plant (PREPP) facility will begin processing waste, as necessary, in FY 1987. The construction of the WIPP is proceeding extremely well, and we now expect to complete this facility by December 1986. Construction of facilities to process stored transuranic waste at the Savannah River Plant and the Hanford site are 2-3 years behind those shown in the Plan. These have been delayed because of our need to ensure a thorough technology transfer, enabling us to build the most cost-effective facilities, and in no way represents a lack of commitment to address the transuranic waste stored at these sites.

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT
FY 1986 BUDGET REQUEST
($ IN MILLIONS)

	FY 1985		FY 1986	
	AUTH.	APPROP.	AUTH.	APPROP.
INTERIM WASTE OPERATIONS	$314.8	$324.5	$377.2	$379.4
LONG TERM WASTE MANAGEMENT TECHNOLOGY	326.7	326.7	307.8	307.8
(DEFENSE WASTE PROCESSING FACILITY)	(256.1)	(256.1)	(236.5)	(236.5)
TERMINAL STORAGE (WIPP)	77.5	77.5	25.4	25.4
PROGRAM DIRECTION	1.9	1.9	2.4	2.4
TOTAL	$720.9	$730.6	$712.8	$715.0

Chart 31

DEFENSE WASTE AND BYPRODUCTS MANAGEMENT
INCREASES OVER FY 1985
(DOLLARS IN MILLIONS)

FY 1985 AUTHORIZATION	**$720.9**
• **ESCALATION**	**+20.7**
• **FIRST YEAR OPERATION OF TRU FACILITIES (IDAHO)**	**+9.3**
• **TREAT NEW PUREX WASTE AND SUPPORT DESIGN OF HLW IMMOBILIZATION FACILITY (HANFORD)**	**+12.6**
• **ACCELERATE SALT REMOVAL/PROCESSING TO ASSURE ADEQUATE TANK SPACE AND PROVIDE FEED FOR SALTSTONE FACILITY (SAVANNAH RIVER)**	**+6.2**
• **PROVIDE CONSTRUCTION TO ASSURE "CONTINUED OPERATIONS"**	**+13.4**
• **PROVIDE HAZARDOUS CHEMICAL WASTE TECHNICAL SUPPORT**	**+1.8**
• **MAINTAIN WIPP AND DWPF SCHEDULES**	**-74.4**
• **OTHER SITE IMPROVEMENTS**	**+2.3**
FY 1986 REQUEST	**$712.8**

Chart 32

I would now like to address FY 1986 funding needs as shown on Chart 31. A summary of the reasons for our budget changes is shown in Chart 32. While we are beginning to reduce our overall construction requests for the DWPF and the WIPP, our operating expenses are increasing because we are adding a new dimension to our program—processing waste for eventual disposal.

I will now describe our FY 1986 program in more detail.

Interim waste operations

The principal objective of this program is the safe and environmentally acceptable management of existing and newly-generated waste from nuclear materials and weapons production and naval reactors operations, pending implementation of permanent disposal operations. The program includes the operation and maintenance of HLW storage tanks, bins, and related processing and storage facilities at Hanford, the Savannah River Plant, and INEL; the operation and maintenance of LLW burial grounds at the Savannah River Plant, Oak Ridge National Laboratory (ORNL), Idaho National Engineering Laboratory, Hanford Reservation, Los Alamos National Laboratory, Sandia National Laboratory, and Nevada Test Site; the retrievable storage of transuranic waste at various sites; the operation of low-level liquid waste facilities; the operation of three filter test stations; and the processing of low-level gaseous effluents.

During fiscal years 1985 and 1986, the transfer of HLW from old tanks to new tanks will continue at the Hanford site. This program was curtailed in FY 1985 due to storage limitations in the new HLW tanks. Increased funding is required in 1986 to support continuation of the stabilization and isolation of old single-shell HLW tanks. An additional 10 tanks will be isolated from the environment in FY 1985 and 9 in FY 1986 for a total of 83 out of 149. This program will be completed in FY 1989 as scheduled. Also at Hanford, the solidification and encapsulation of an additional 161 strontium capsules from HLW was completed in the B-Plant facility in FY 1984, and we expect to complete encapsulation of the remaining strontium by the second quarter of FY 1985 (a total of 630–660 capsules planned) for safer storage and potential beneficial use. Encapsulation of the entire backlog of cesium (1,575 capsules) was completed in FY 1983.

A major effort at Hanford in fiscal years 1985 and 1986, after the strontium campaign is completed, will be to convert the B-Plant facility for processing liquid TRU and HLW from PUREX operations. Studies over the last year have identified the benefit of using B-Plant for treating newly generated waste from PUREX. When fully operational, processing of PUREX waste streams in B-Plant will save significant costs in two ways. First, by segregating the low-level component from the waste, HLW tank farm storage space will be saved. Second, the volume of waste which will ultimately have to be vitrified for disposal will be significantly reduced. Vitrification of as much as 40 million gallons of waste can be avoided, with a resultant saving in excess of $1.0 billion. Initial processing demonstrations on liquid TRU waste will be complete by the end of FY 1986.

Also at Hanford, construction of the eight double-shell tanks begun in 1983 to provide storage space for PUREX waste is 6 months ahead of schedule. Construction will be completed in the second quarter of FY 1986, assuring that adequate storage space is available for PUREX waste. Construction of a portable grout facility to solidify low-level liquid waste for shallow land disposal, as part of the Waste Handling and Isolation Facilities Project, is continuing. Operations will begin in FY 1986.

The Savannah River Plant waste transfer program is scheduled for completion in 1994. Waste transfer from single-shell tanks has been accelerated and will now be completed in FY 1986. An optimum schedule interface will be maintained between waste preparation in the tank farm and feed requirements for the DWPF. In order to assure an adequate backlog of feed for DWPF operation, sludge washing facilities will begin operation in 1986. Installation of salt decontamination facilities will continue in 1986, and operation will begin in 1987. This activity will save a significant volume of tank space. Design and construction of a New Waste Transfer Facility to replace old inadequate facilities and to interface with the DWPF will continue in FY 1986.

At Oak Ridge, there is a priority need for a new LLW disposal facility. Several factors create this priority need: (1) curtailment of the use of existing disposal facilities at Y-12 for environmental reasons; (2) the need to process and dispose of immobilized radioactive sludge resulting from liquid process waste generated at Y-12 and the Oak Ridge Gaseous Diffusion Plant; and (3) the near-term exhaustion of the disposal capacity at ORNL. Efforts to design and develop a new LLW disposal facility are continuing. A preferred site has been selected and studies are underway to identify additional measures to assure the environmental acceptability of disposal operations. Evaluation of alternatives for facility design and waste treatment will continue in FY 1985. As part of a major review of waste disposal practices at the Oak Ridge complex, a revised Environmental Impact Statement for the disposal facility will be issued in early FY 1986. Funding is requested for detailed design of the preferred alternative in FY 1986, which will permit facility operation possibly by late FY 1988.

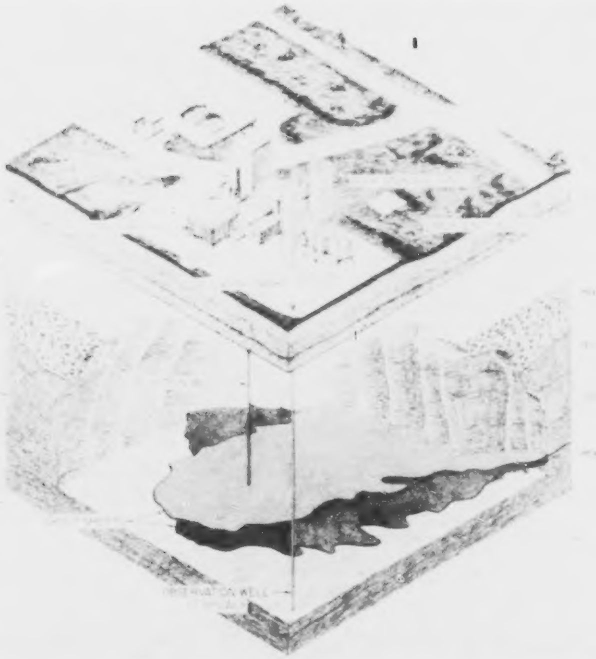


Chart 33

As shown in Chart 33, the New Hydrofracture Facility at the ORNL has been in operation since 1981, and disposal of the backlog of gunite tank waste was completed in early 1984. In August 1984, unexpected elevated levels of radioactivity were discovered in a deep monitoring well located within approximately 1,000 feet of the injection well. Oak Ridge is currently gathering and analyzing additional data from the well. No health or safety hazard exists, and the National Academy of Sciences is participating as an independent reviewer of the data. Grout injections at the New Hydrofracture Facility have been suspended pending completion of studies to determine the cause of the elevated radioactivity levels, to assess the significance of any environmental impacts, and to determine if any corrective actions are required.

The DWBM program assumed responsibility for the management of low-level radioactive waste at the Feed Materials Production Center (FMPC), Fernald, Ohio, in FY 1985. Waste generation is expanding rapidly with increased production efforts at that facility. To handle the increase, a decision has been made to process, package, and transport all LLW for disposal at another DOE facility. As opposed to processing and storage in silos on site, this promises to save the taxpayer about $20,000,000 over the next twenty years. Some of the waste, which can be shipped with minimal processing, will be shipped in FY 1985. For FY 1986 we have proposed construction of a facility which will process the rest of the waste so it can also be shipped. The facility will be operational in 1989. Until that time, waste will be stored on site in drums. In the outyears, we will also be evaluating options for the disposal of waste previously stored in pits and silos since the early 1950's.

In FY 1986 at INEL, the SWEPP will begin the first full year of operation. The SWEPP will examine and certify stored waste containers for the WIPP. The PREPP will process stored waste containers that do not meet the WIPP criteria. The PREPP will begin cold check-out in FY 1986 and begin hot operation in FY 1987.

Waste volume reduction

Waste volume reduction is an important element of the Interim Waste Operations Program because it extends the lifetime of storage and disposal facilities and delays the need for new facilities. At the Savannah River Plant, for example, our goal for fiscal year 1985 and 1986 is to annually gain 6 million gallons of HLW storage through our evaporation processes. This is the volume equivalent of about six new tanks. At Hanford, evaporator operations continue to support PUREX reprocessing operations and reduce tank requirements.

Solid waste volume reduction operations will continue in order to reduce the rate of expansion of new burial ground facilities at our sites. Segregation and examination of TRU waste will reduce the amount which must be stored, certified, and eventually transported to and emplaced in the WIPP.

Funds invested in development and demonstration of volume reduction and waste segregation techniques will result in decreased requirements for disposal and storage facilities and their related operating, closure, and long-term maintenance and surveillance costs. We will continue to study improved volume reduction technology to enhance both transportation and disposal.

During FY 1986 we will continue to dispose of LLW and to retrievably store TRU waste. We are continuing to develop procedures to assure that newly generated TRU waste will be acceptable for emplacement in the WIPP. This certifiable waste will be stored separately.

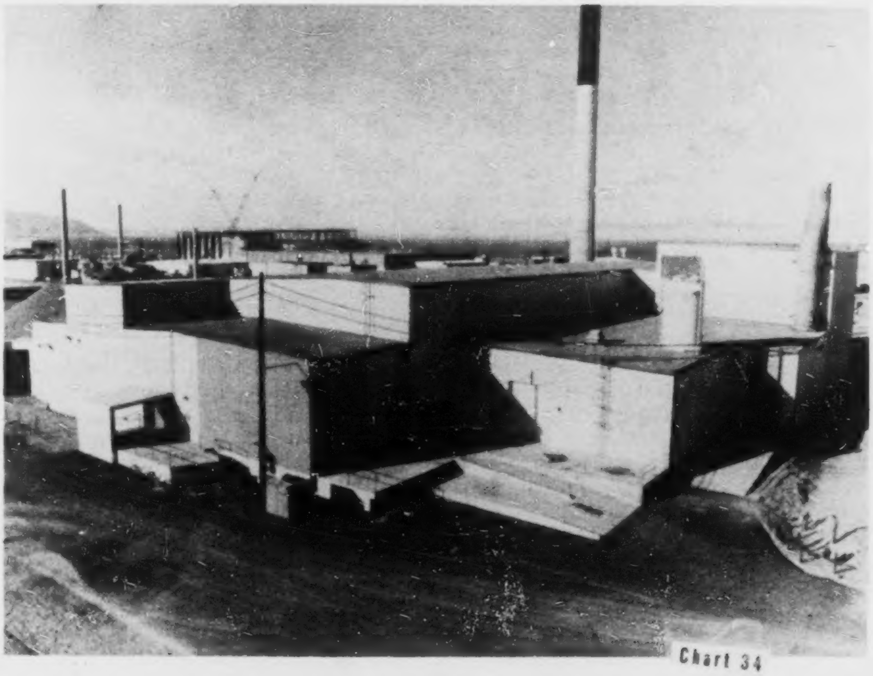


Chart 34

At the INEL, the New Waste Calcining Facility (NWCF) (Chart 34) began operations in September 1982. This facility converts liquid HLW into a granular solid, called "calcine," for interim storage in bins. The NWCF is a critical element of the fuel processing operation at INEL, since there is no excess capacity for lag storage of liquid HLW. Since startup, this facility has calcined more than one million gallons of liquid. In fact, the NWCF has consistently operated at greater than design basis, sometimes as much as 50 percent greater than anticipated. The construction of the sixth set of storage bins for calcine will continue at INEL with a scheduled completion in September 1985. Construction of the seventh set of bins will begin in March 1985 and be completed in June 1989, assuring that sufficient waste storage capacity is available to support production activities.

At Oak Ridge, we will complete a program to size reduce and sort approximately 40,000 tons of contaminated scrap metal and trash in FY 1986, thus minimizing a potential environmental problem. The waste will be disposed of and the volume of scrap will have been significantly reduced. The scrap will be stored for potential recycle.

Landlord responsibilities

Under our landlord responsibilities, we will continue restoration of badly deteriorated general purpose support facilities and equipment to an acceptable standard of safety, reliability, and efficiency. Our goal is to complete the facilities restoration part of our landlord responsibilities at the Hanford site in FY 1987. The FY 1986 Hanford Landlord Program continues the design and construction of a new central warehouse facility to replace the old one which is beyond economical repair.

Landlord responsibilities at INEL were assumed in FY 1983. Maintenance, repair, and replacement activities continue for general purpose site support facilities such as security installations, utilities, roads, and service buildings. Also, the landlord program continues to maintain site fire and safety alarm systems. A major enhancement of site security systems and facilities is underway. In FY 1984 the number of site security personnel was increased from about 100 to 300. The INEL Security Upgrade Project to provide accommodations for security personnel and equipment, to harden facilities, and to improve site access control will start in FY 1986. Construction of the Test Reactor Area Security System Upgrade to meet requirements for detection and prevention of intrusion was started in FY 1985 and will continue in FY 1986.

Decontamination and decommissioning

We are responsible for about 200 contaminated surplus defense facilities, including reactors, reprocessing plants, and waste management facilities. The facilities have been stabilized and are routinely monitored and maintained. Our program emphasizes the safe management of these facilities, stressing beneficial reuse of structures, reduction of future maintenance costs, and recovery of valuable materials where cost effective. For FY 1985 we will continue to monitor and maintain all surplus defense facilities and continue high priority decommissioning work at INEL, the Mound Facility, the ORNL, and the Hanford site with particular emphasis on facility reuse and cost effectiveness. In FY 1986, we plan to complete the NEPA process and begin decommissioning the surplus production reactors at Hanford. The preferred alternative is in-place stabilization of the reactors and entombment with soil.

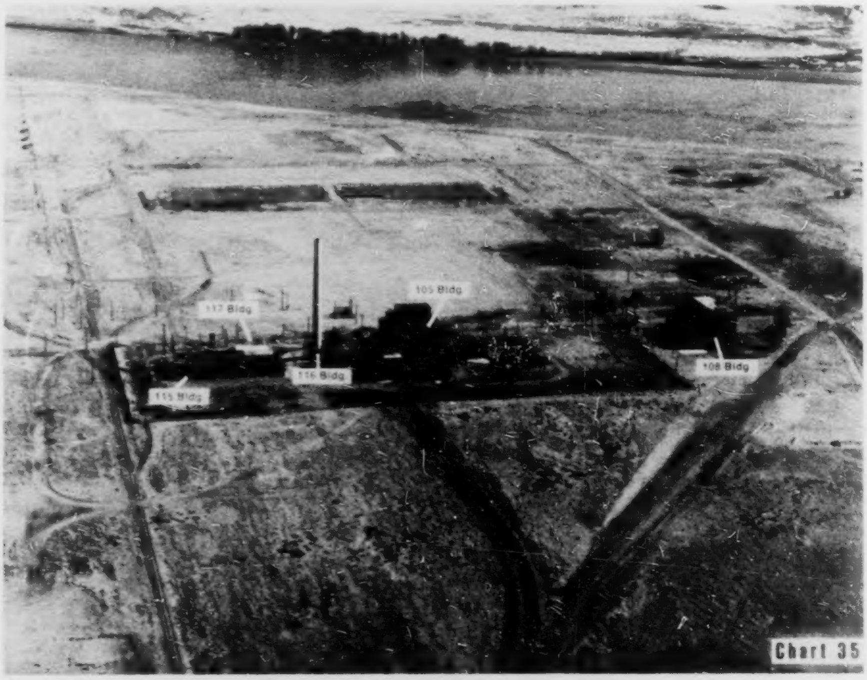


Chart 35

Chart 35 is a photograph of the 105-F reactor, which will be the first of eight reactors to be decommissioned. In FY 1986, we also plan to conduct characterization studies of the Grand Junction Treasure Island Site uranium ore residues, which were generated in support of Defense Program activities and are a source of groundwater contamination.

Transportation operations

We are also responsible for the Department-wide transportation management program to assure the safe, secure, environmentally acceptable, efficient, and economic shipment of DOE materials in compliance with applicable Federal and State laws and regulations. This responsibility includes operational aspects of materials transportation, radioactive materials packaging operations and certification, and classification of explosives for transportation in support of all Departmental programs.

Major activities in FY 1985 include continued improvements on data automation for more efficient utilization and management of resources; continued negotiations toward reduced or volume discount rates on DOE and DOE contractor shipments; continuation of training and workshops for personnel involved in DOE shipment of hazardous materials; and development of a certification program for traffic managers.

In FY 1986, the Transportation Management Program will continue to support its data automation and training programs, as well as activities necessary to ensure the most economic shipping rates. Criteria for Hazardous Materials Packaging Quality Assurance will be developed to assure all packages meet requirements and are properly maintained. A Safety Analysis Report for Packaging (SARP) Evaluation Guide will be prepared to establish uniformity among all field offices for the evaluation of SARP's.

A Department-wide shipment plan for hazardous materials, chemicals, and wastes will be developed in FY 1986, and evaluations will be performed to assure the DOE complies fully with all applicable regulations and requirements. Compliance training programs will be modified as necessary to accommodate any deficiencies noted in the evaluations. In addition, a program will be funded in FY 1986 to develop a more comprehensive management information and outreach program with State and local governments, Indian tribes, and other entities that have expressed concerns regarding DOE radioactive materials shipments through their jurisdictions.

Long-term waste management technology

This program addresses the long-term management and disposal of defense wastes. The program is consistent with policies set forth in the Defense Waste Management Plan for permanent disposal of defense HLW and TRU waste. The Long-Term Waste Management Technology Program has been expanded to include hazardous chemical defense waste management technology to respond to the increased attention at DOE sites in managing such waste in compliance with appropriate EPA regulations.

High-level waste technology

As I mentioned earlier, we are developing the technology for the long-term management of defense HLW at DOE sites. Our first emphasis is on the DWPF at the Savannah River Plant and second is the Hanford Waste Vitrification Plant (HWVP) at the Hanford site. During FY 1986 we will continue large-scale tests with simulated waste to optimize the design and demonstrate the reliability of the DWPF systems, including slurry feed, off-gas, salt disposal, and process controls. Smaller scale tests with actual HLW from the Savannah River Plant will continue in hot cells. Together, these tests will ensure that the DWPF will work as designed. We will continue to describe and document the predicted behavior of the glass waste form in a geologic repository and make confirmatory tests. During FY 1986 emphasis will shift toward planning, development, selection, and implementation of the long-term technology for HLW at Hanford. Efforts will focus on the preconceptual design of the HWVP, which will provide the same service as the DWPF.

DEFENSE WASTE PROCESSING FACILITY

SAVANNAH RIVER PLANT

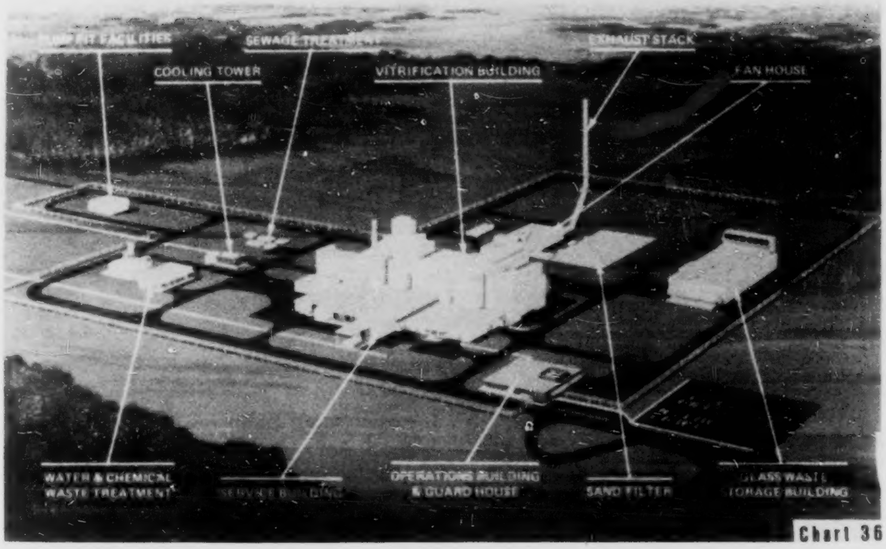

PUMP PIT FACILITIES
SEWAGE TREATMENT
EXHAUST STACK
COOLING TOWER
VITRIFICATION BUILDING
FAN HOUSE
WATER & CHEMICAL WASTE TREATMENT
SERVICE BUILDING
OPERATIONS BUILDING & GUARD HOUSE
SAND FILTER
GLASS WASTE STORAGE BUILDING

Chart 36

(Chart 36) The DWPF will immobilize defense HLW at the Savannah River Plant for storage, transportation, and disposal in a geologic repository. The sludge fraction of the HLW, which contains most of the hazardous radionuclides and virtually all of the long-lived activity, will be immobilized directly in borosilicate glass after extracting mercury. The activity in the soluble salt fraction of the waste, primarily radioactive cesium, will be separated by precipitation in the tank farm. Cesium can possibly be used as a beneficial byproduct, in an appropriate form. The decontaminated salt will be solidified and disposed of on the Savannah River site beginning in FY 1987, to free-up storage tank space. When the DWPF is operational in FY 1989, we will begin to work off the backlog of HLW from production operations at the Savannah River Plant, reaching a steady-state operation in about 15 years.

41151-4 — VIEW LOOKING NE-GENERAL SITE

Chart 37

(Chart 37) Construction of the DWPF began ahead of schedule in October 1983. By the end of FY 1986, design will be more than 90 percent complete and construction of the main process building and support facilities will be about 45 percent complete. Construction activity will peak in FY 1986, with over 2,000 construction workers on site. We are requesting $205 million for the project in FY 1986, a $25.5 million decrease from FY 1985. Although less than the approved baseline, the requested funding will maintain scheduled project completion in June 1989 and the current total estimated cost of $870 million. Operation of facilities to solidify decontaminated salt solution for disposal as low-level waste will begin in FY 1987.

It is very important that our construction schedule be maintained. We have planned this project to be cost effective consistent with the Grace Commission's recommendations. Any delays will not only increase costs, but will also cause significant operational problems at the Savannah River Plant. We are running out of tank space in which to store HLW, and we must continue to remove waste from the old tanks before problems develop. Major delays in the DWPF project could require building additional tanks and make the HLW cleanup job greater and more expensive.

The cost estimate for this project has been reduced by about 70 percent from the original FY 1979 capital cost estimate of $2.8 billion through research and development and design optimization. We will continue to pursue opportunities to reduce its cost further through effective project management by DOE staff and contractors during the construction phase.

Hanford waste vitrification plant

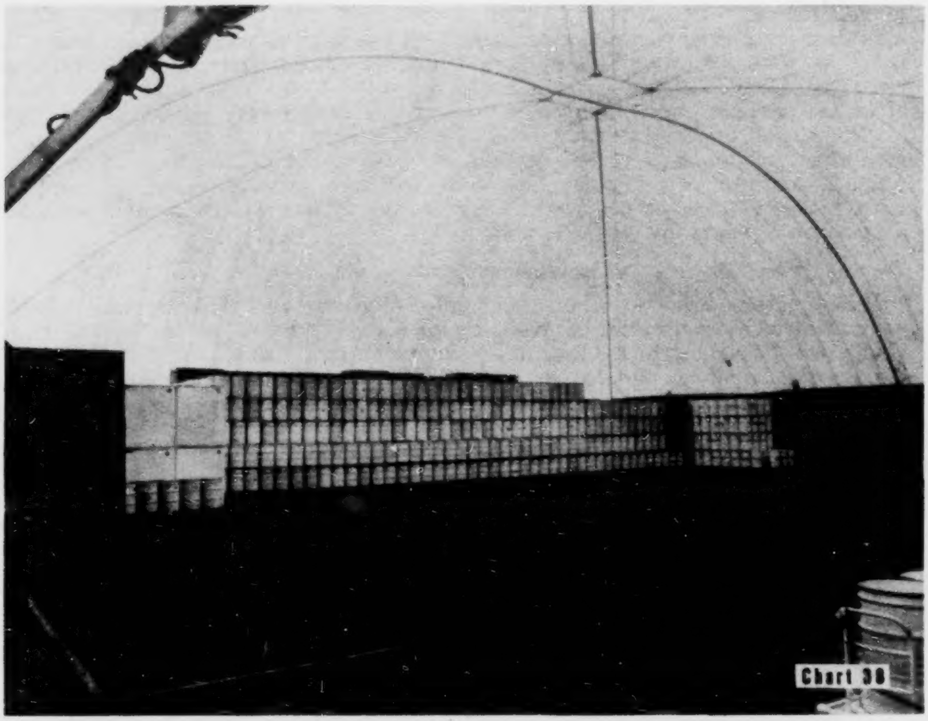
Since the mid 1940's nuclear fuel has been irradiated and reprocessed at the Hanford site to produce nuclear materials for national defense programs. The liquid radioactive waste from fuel reprocessing has been neutralized and stored in large underground steel tanks on an interim basis pending decisions on the timing and methods for permanent disposal.

The HWVP will convert Hanford HLW to a glass form for permanent disposal. It serves the same function and is based on the same process technology as the DWPF now under construction at the Savannah River Plant. While some refinements and testing are needed, the basic technology for vitrification of Hanford HLW is in hand and facility design and construction can be undertaken with confidence.

Design support and engineering R&D will continue in FY 1986 for an immobilization facility to prepare Hanford HLW for disposal. Existing technology and design data from the DWPF will be used to the maximum extent practical to reduce cost and duplication of effort. Basic process requirements are similar to the DWPF except that an existing waste preparation facility at Hanford, B-Plant, will be used instead of in-tank processing. The decontaminated salt fraction will be immobilized and disposed as LLW. Preconceptual design of the HWVP will continue in FY 1986 with the addition of the architect/engineer to the project.

Transuranic waste technology

The primary purpose of the TRU Technology Program is to support the WIPP. The first priority is to routinely certify newly generated waste and to commence retrieval, certification, and processing of stored waste. This ensures a backlog of waste for the successful disposal demonstration in the WIPP.



At INEL, we completed the designs for two pilot plants in FY 1983—the SWEPP to examine and certify stored waste containers for the WIPP, and the PREPP to demonstrate processes for treating stored waste containers as shown in Chart 38 that do not meet the WIPP criteria. In FY 1984 we completed construction of the SWEPP. In FY 1985 checkout and startup will be completed with experimental operations beginning in FY 1986. Construction of the PREPP will continue in FY 1985 with startup and checkout in FY 1986.

Other FY 1986 activities include: (1) completion of final waste inventory plans at each storage site; (2) demonstration of the mobile non-destructive assay instrumentation to certify waste; (3) demonstration of a waste transport system; (4) testing of an on-site buried waste stabilization process, in-situ vitrification; (5) continuation of NEPA documentation to retrieve, certify and transport waste to the WIPP from all sites other than INEL and generating sites shipping to INEL; and (6) continuation of technology development for reduced waste generation.

Low-level waste technology

The Low-Level Waste Technology Program supports DOE waste operations for the disposal of low-level solid wastes. The objectives of this generic technology program are to: improve techniques for disposal by shallow land burial including methods for accurate prediction through adequate monitoring and modeling; provide supporting documentation in assuring compliance with DOE criteria for disposal by shallow land burial; develop cost effective treatment processes to stabilize certain LLW streams and reduce volumes by generation avoidance; and evaluate disposal concepts such as greater confinement. In FY 1986 funding will provide for integrated field testing for shallow land burial improvements, testing to research waste source transport mechanisms, and limited development for shallow land burial corrective measures and treatment processes.

Hazardous chemical defense waste management

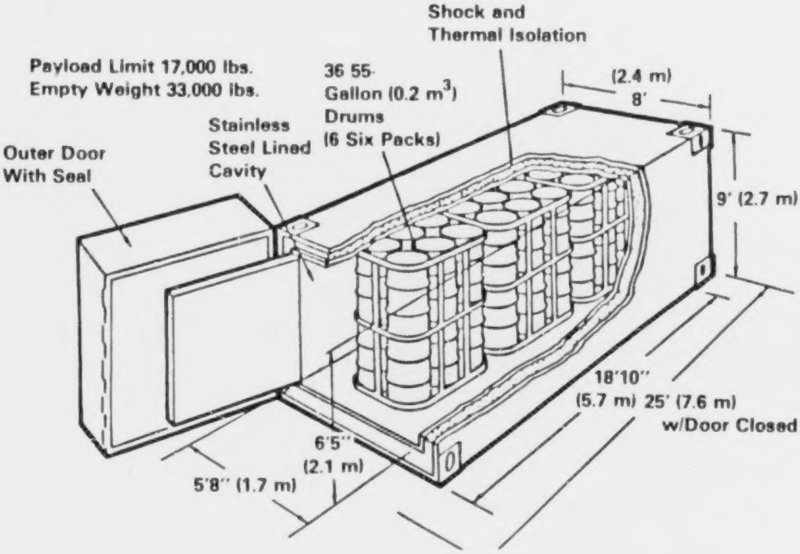
The Hazardous Chemical Defense Waste Management program supports DOE site operations for the treatment, storage, and disposal of hazardous wastes generated by Defense Program activities. This program will be supportive of hazardous waste efforts required to cost-effectively comply with EPA regulations in implementation of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). The objectives of this generic technology application program are to provide for development or identification and application of existing techniques in processing hazardous waste from currently generated Defense Program waste streams and environmental restoration of inactive Defense Program hazardous waste sites. Program elements consist of waste generation reduction, waste treatment, chemical recycle utilization, disposal alternatives, monitoring and modeling, probabilistic risk assessment, and environmental restoration. In FY 1986 funding will provide for development of hazardous waste inventory and technology data bases, and application of technology emphasizing treatment processes which will bring waste streams into compliance with hazardous waste regulation considerations.

Transportation research and development

This program seeks to assure that safe, efficient, and reliable transportation equipment and systems will be available for defense nuclear wastes. Packaging development, packaging technology development, testing risk analyses, and other related activities are conducted at the DOE Transportation Technology Center at Sandia National Laboratory at Albuquerque, New Mexico.

In FY 1985, work will continue on the development of the TRUPACT packaging intended primarily for transporting contact-handled TRU waste; the defense HLW cask and its adaptation to remote-handled TRU waste; and the Beneficial Uses Shipping Systems (BUSS) cask. Hypothetical accident condition tests were conducted on a prototype TRUPACT during the summer of 1984. Results from the dynamic tests were as anticipated, deformations were as predicted, and measured seal leak rates were within the allowable range. Excessive seal temperatures were reached during fire testing, causing the packaging seals to exceed allowable leak rates during conditions of an extended hypothetical accident. Design modifications will be required to limit the inner door seal temperatures and assure acceptable leak rates are maintained. Work will continue in a base technology program which has DOE-wide applicability for all DOE nuclear program transportation needs. The base technology program includes packaging design development, materials investigations, standards development, testing, test facilities development, operational safety and risk analyses, Environmental Impact Statement preparation, logistics and economic analyses, regulatory issues analyses, and data base development.

TRUPACT (TRUCK VERSION) PRELIMINARY DESIGN



Shock and Thermal Isolation
Payload Limit 17,000 lbs.
Empty Weight 33,000 lbs.
36 55-Gallon (0.2 m^3) Drums (6 Six Packs)
(2.4 m)
8'
Stainless Steel Lined Cavity
Outer Door With Seal
9' (2.7 m)
18'10"
(5.7 m)
25' (7.6 m) w/Door Closed
6'5"
(2.1 m)
5'8" (1.7 m)

CHART 39

(Chart 39) The first TRUPACT unit will be operational in FY 1985, and a demonstration period will begin. In FY 1986, the operational demonstration of TRUPACT will be completed, and fleet unit fabrication will commence. Value engineering and second generation modifications will be pursued for improved efficiency and decreased unit cost.

TRANSPORTATION SYSTEM WEIGHTS — DHLW TRUCK CASK

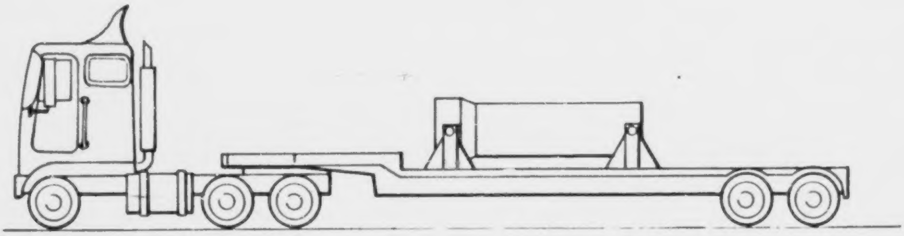
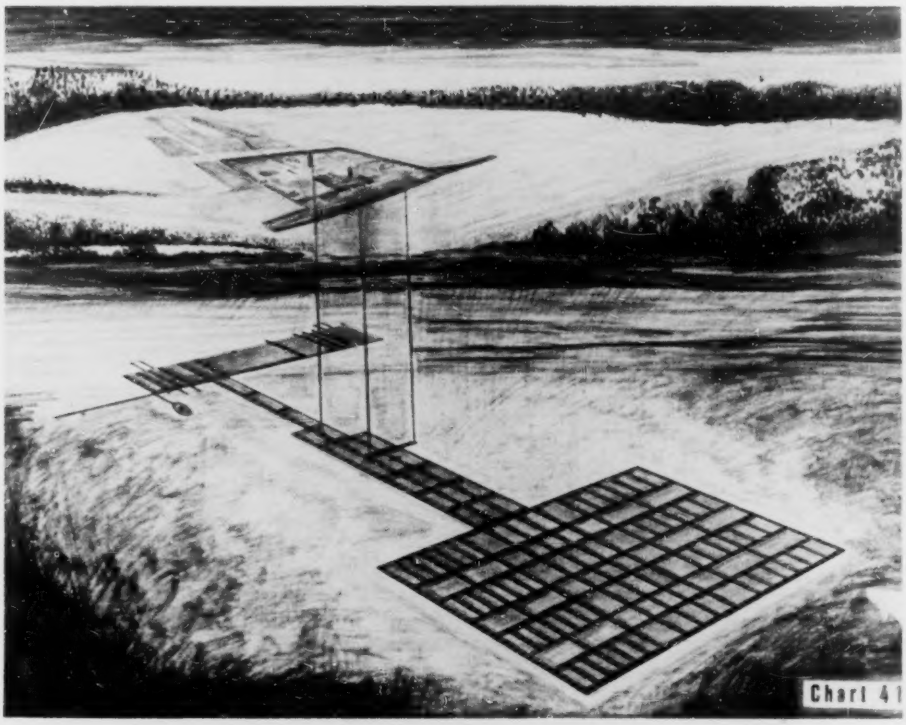


CHART 40

(Chart 40) The defense HLW cask half-scale model will be fabricated and tested for regulatory compliance, and development will be completed during FY 1986. It will be used to transport HLW glass logs from DWPF to a repository and will be adapted for use in transporting remote-handled TRU waste to WIPP. Improved data base access will also be examined and improvements instituted.

The defense HLW cask prototype fabrication will commence and the BUSS cask stainless steel unit will be operational during FY 1986. A remote-handled TRU waste cask program that will permit a limited number of remote-handled TRU shipments in late FY 1987 will be firmly established. The base technology portion of the program will be integrated with the Transportation R&D activities conducted by the DOE Office of Civilian Radioactive Waste Management.

Terminal storage—waste isolation pilot plant



(Chart 41) The WIPP, now under development near Carlsbad, New Mexico, will provide a research and development facility to demonstrate the safe disposal of radioactive waste from national defense programs. The WIPP is authorized by Public Law 96-164 and is exempt from licensing by the Nuclear Regulatory Commission.

The primary objectives of WIPP are to demonstrate, through a full-scale pilot plant, the technical and operational methods for permanent isolation of defense-generated TRU radioactive waste and to provide a facility for experiments on HLW in bedded salt. The facility is designed to receive, inspect, emplace, and store defense waste. It will have the capability of disposing of defense TRU waste and conducting experiments with defense-generated HLW. The experiments with HLW will be coordinated with the Office of Civilian Radioactive Waste Management consistent with the procedural agreement executed October 22, 1984.

The construction of permanent surface and underground facilities started in July 1983, following an extensive exploratory program. This exploratory program includes two large diameter shafts and mining over 2 miles of drifts (tunnels) to confirm the subsurface geology. Construction completion is scheduled for December 1986. A test and checkout period will follow, with waste receiving operations targeted for October 1988.

Much construction progress has been made during FY 1984 and FY 1985. Enlargement of the 6 foot diameter exploratory shaft to its final 19 foot diameter has been completed. The third shaft for facility ventilation has also been completed. Major contracts for constructing access roads, a rail spur, and a 31 mile water pipeline are completed. Mining for the underground experimental areas will be completed in March 1985. The main waste handling building was started in mid-1984.

With site characterization and site validation complete, Sandia research and development activities will emphasize in-situ experiments. These experiments and demonstrations will establish the technical basis for defense waste disposal in bedded salt. This work will be based on an extensive background of predictive model development and laboratory/field testing. Specific technology experiments will include thermal/structural interaction, operations demonstration, and waste package performance. The experiments will be conducted in areas mined during the exploratory program.

Emergency response training and an emergency response exercise have been held. Such activities will continue. A Quality Assurance Audit will be held in the spring to ensure safety and efficiency during disposal operations and concurrent mining operations.

Good relations with the State of New Mexico are important in continuing construction of WIPP. Issues of concern to the State are being actively negotiated within the framework of the Consultation and Cooperation Agreement.

One primary State concern is the mission of WIPP. Our mission is limited to the demonstration of TRU waste disposal and experiments with defense HLW.

As stated earlier, we will coordinate our HLW experiments with the Office of Civilian Radioactive Waste Management and are committed to removing the HLW upon completion of the experiments or decommissioning of the facility. This mission is consistent with Public Law 96-164, its Conference Report (House Report 96-702), and subsequent budget authorization legislation. We want to reemphasize that the WIPP facility is not being designed for the permanent disposal of HLW, nor has the site been characterized for such permanent disposal. Our site characterization program was directed toward the statutory mission of demonstration of disposal of TRU waste and the HLW experiments.

In February 1984, the Secretary directed that negotiations with the State of New Mexico continue so that a timely agreement could be reached which defines the WIPP mission within the bounds described above. That agreement was completed in November 1984, and copies have been sent to the appropriate committees of Congress for their information.

The Administration is supporting the WIPP Project with a request for $25.1 million. Fiscal year 1986 will be a peak year of construction at the WIPP site. Site utilities, the exhaust filter building, and the TRUPACT maintenance facility will be completed. Also, the primary waste handling building, started in FY 1984, will be completed in FY 1986. Assuming project activities continue successfully, as they have in the past, WIPP will be ready to receive radioactive waste on schedule in October 1988.

Byproducts and beneficial use

The objective of the Byproducts and Beneficial Use Program is to identify and develop safe, environmentally acceptable, beneficial, and cost-effective applications of radioisotopes and materials from the defense fuel cycle. Also included in the development of power, light, heat, and electrical sources for our national defense needs that are long-lived, reliable, and secure. With the recent reprogramming request, which has been sent to the Congress in response to FY 1985 congressional guidance, we expect to provide 1 year of operational demonstration for each of the three irradiators which will be nearing construction completion in late FY 1985. With regard to prototype power generators using the defense waste byproduct, strontium-90, fabrication of a high power 500 watt radioisotope thermoelectric generator (RTG) will be completed in FY 1985. In FY 1986 the RTG will be fueled and turned over to the Department of Defense for demonstration, such as in the emergency shelter of the unmanned short-range radar station of the North Warning System. In FY 1985 tritium radioluminescent airfield landing lights will be used by the U.S. Air Force at Spangdahlem Air Force Base, Germany, and tested and evaluated with other newly developed equipment for Rapid Runway Repair in Operation Salty-85 Demo.

This completes my presentation. I shall be happy to answer any questions you may have on either the Nuclear Materials Production Program or the Defense Waste and Byproducts Management Program.

[The following questions were submitted to the witness to be answered for the record:]

Mr. STRATTON. In his letter of August 3, 1983, Secretary Hodel indicated that a prototype SIS production facility would be built at Hanford and operated by the end of 1987. In neither the FY 1985 nor the FY 1986 budget request has funding been requested for this project. When, if ever, do you intend to start an SIS production facility project at Hanford?

Mr. COCHRAN. Based on the Department's recent assessment of low cost, prudent risk, deployment alternatives for SIS technology, it has been determined that a prototype SIS production facility would not be warranted or cost-effective. Additionally, on February 6, 1985, Secretary Hodel approved a Defense Programs recommendation that SIS project efforts be focused on preparations to support a request for FY 1987 line item funding for a production facility at Hanford. We are, proceeding with the necessary conceptual design, engineering development, environmental documentation, and administrative activities required to support such a request. If approved and funded, the SIS production facility would begin operation in FY 1992 and would be a timely and important addition to the defense program's material production complex.

Mr. STRATTON. Is the Hanford SIS project currently carried as an approved FY 1987 project in DOE planning? If not, why should we spend any money at the Hanford site until DOE commits to a production facility project?

How much additional funding would be required in FY 1986 if the SIS production facility at Hanford were authorized?

Mr. COCHRAN. Because the Department's budget request for FY 1987 has not yet been fully developed, the Hanford SIS plant project is not an "approved" DOE project. However, certain necessary steps are being taken to support an FY 1987 SIS plant construction project. A number of these activities are best performed at the Hanford site. They include the preparation of environmental studies and documentation, site specific facility planning and conceptual design, and various aspects of plant development.

Additional funding of about $20 million would be needed in FY 1986 to proceed with rapid deployment if the SIS production facility at the Hanford site were authorized. This funding level would provide for performance of engineering design and initiation of conventional construction and modification activities.

Mr. STRATTON. If there is no rapid plan to proceed at Hanford, shouldn't the EDS system at LLNL be broadened to fill the role of a complete production prototype? When could such a prototype be in operation?

Mr. COCHRAN. Current plans for SIS deployment, if implemented, involve the construction of a production plant at the Hanford site with work beginning in FY 1987. Technical and operational performance validation for a production scale AVLIS separator and supporting laser systems will be completed in existing LLNL facilities and supplemented by additional process development work at the Hanford site. However, the LLNL facilities will not be capable of sustained production operation and there are no plans to develop a production capability at the Livermore site. This is in keeping with the Department's policy of performing production operations at its established production sites, whenever possible. We believe that this course of action best supports the successful realization of a production capability by FY 1992 at substantially lower cost then broadening the EDS system at LLNL to fill the role of a complete production prototype followed by construction of a production capability at Hanford.

Mr. STRATTON. [Deleted.] Building 371 at Rocky Flats for plutonium recycling will apparently not operate. How much loss is planned Pu supply does Building 371 represent?

Considering the Building 371 problems, the delayed start of the L Reactor, the increased cost, and waste associated with blending, isn't it prudent to proceed rapidly with an SIS production facility?

Mr. COCHRAN. The planned full-scale operation of Building 371 at Rocky Flats has been delayed until sometime after FY 1993. At present, we are evaluating the recovery processes and capabilities to be modified in Building 371. As a result of the delay in operating this facility, we have extended production support operation of Building 771 at Rocky Flats and are utilizing available recovery capacity at Nuclear Materials Production sites, including Savannah River and Hanford, to reduce the backlog of plutonium scrap which we have been unable to recover on the original schedule. Until plans for the ultimate use of Building 371 have been finalized, there will be a backlog of [deleted] of hard-to-recover weapon-grade plutonium scrap. We are reviewing reprocessing capacity to establish the most cost effective method for recovery of this plutonium consistent with other program requirements and schedules.

The Department is proceeding expeditiously toward deployment of SIS technology at the Hanford site. Our objective is to have the capability, in the early 1990's, to clean up DOE owned fuel-grade plutonium to meet weapon-grade specifications. To achieve this schedule, SIS development activities are directed toward supporting a possible request for FY 1987 line-item funding which would result in plant operation in FY 1992.

Mr. STRATTON. How much money is spent at Savannah River to blend the fuel-grade plutonium to weapons grade? And at other sites?

How much additional liquid waste is produced [deleted] at 3 percent Pu-240 versus that produced at 6 percent Pu-240?

Mr. **Cochran**. The FY 1986 budget submittal contains $15.6 million for the Savannah River Plant to support blending the existing fuel-grade plutonium with high-purity plutonium to increase the availability of weapon-grade plutonium. This funding represents the incremental costs for target fabrication, reactor operation, processing of targets, waste management, and related capital equipment and construction at the Savannah River Plant. Regarding the other sites, the FY 1986 budget submittal contains $17.2 million to support blending including processing old N Reactor fuel to separate the fuel-grade plutonium, waste management, and related capital equipment and construction at the Hanford site; preparation of uranium metal billets at Fernald, Ohio; and transportation of the uranium billets and fuel-grade plutonium to the Savannah River Plant.

The fuel-grade plutonium used for blending is obtained from processing N Reactor fuel now in storage at Hanford. This fuel-grade plutonium will be processed whether the recovered plutonium is used ultimately in blending or not, so the amount of waste generated in processing will be the same regardless of where and how the recovered plutonium will be used. Thus, the only incremental waste attributable to blending is from the processing of high-purity plutonium at the Savannah River Plant. This volume of waste is about 75 percent greater than from processing weapon-grade plutonium because fuel throughout is about 75 percent greater with the high-purity plutonium. Even though high-purity plutonium targets are only irradiated half as long as weapon-grade plutonium targets, the increase in throughput is not 100 percent because of additional downtime for refueling. [Deleted.]

Mr. **Stratton**. Thank you very much. Does anybody have any questions? Mr. Dyson.

Mr. **Dyson**. Only a statement. I bet you if we are all here 5 years from now, I know you won't be, if we are all here, we will hear the same thing.

Mrs. **Holt**. We have made progress.

Mr. **Stratton**. That is the commercial waste that we are going to hear. The military is well organized.

Mr. **Dyson**. I am willing to listen. Tell me where.

Mr. **Stratton**. Anybody else?

Thank you very much, Mr. Cochran and the others. In view of the hour, I think we would adjourn at this time, and we will meet at 10 o'clock here tomorrow, and Mr. Cook and Mr. Ofte will have an opportunity to make their presentations at that time, following Admiral McKee on naval nuclear proposals.

We are in the main committee room tomorrow morning. We stand adjourned until 10 o'clock tomorrow.

[Whereupon, at 4:45 p.m., the subcommittee was adjourned to reconvene at 10 a.m., Friday, February 22, 1985.]

House of Representatives,
Committee on Armed Services,
Procurement and Military
Nuclear Systems Subcommittee,
Washington, DC, Friday, February 22, 1985

The subcommittee met, pursuant to call, at 10 a.m., in room 2118, Rayburn House Office Building, Hon. Samuel B. Stratton (chairman of the subcommittee) presiding.

Mr. Stratton. The subcommittee will come to order.

Our first witness is Deputy Assistant Secretary for Security Affairs, Mr. Billy Cook.

We will be happy to have your testimony, Mr. Cook.

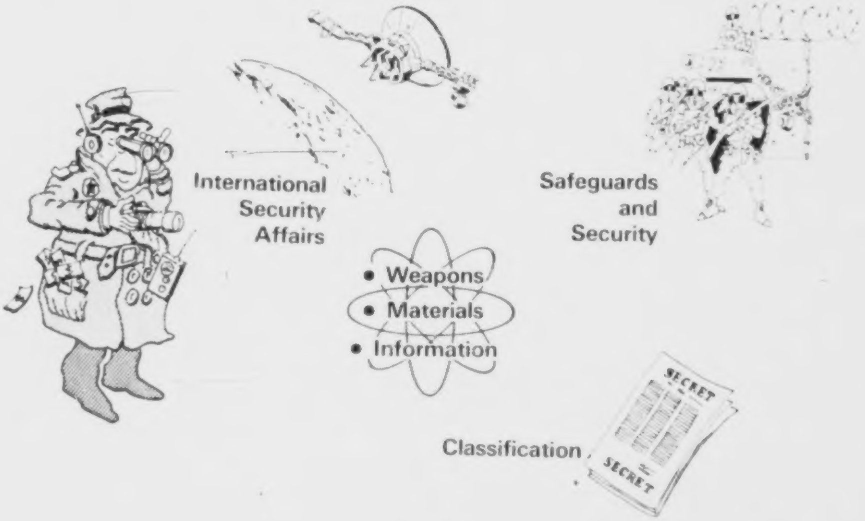
STATEMENT OF BILLY G. COOK, DEPUTY ASSISTANT FOR SECURITY AFFAIRS, DEPARTMENT OF ENERGY

Mr. Cook. Good morning, Mr. Chairman and members of the committee. This is my first time to appear before this committee. I would like to express my appreciation for the opportunity to work with you. I hope that in the future you and I and the staff can work much closer on the important matter of safeguards and security. What I would like to do at this point, with your permission, is to submit my prepared remarks for the record, and to give you an overview of the programs under my cognizance, where we are going and the funding requirements.

Mr. Stratton. Without objection, your statement will be included in the record and then you may proceed as you see fit.

Mr. Cook. Sir, I have recently retired from the military. I have been in the business of nuclear security and survivability for about the last 6 years. Now I have the responsibility for the subject area in the Department of Energy.

DEFENSE PROGRAMS — SECURITY AFFAIRS



Within the area of security affairs, I have three offices under my purview that look at security-related matters throughout the world. These three as shown here are: International Security Affairs, Safeguards and Security and Classification. The composition of these offices is about 160 people.

I would like to make a few remarks about each of these offices, then I would like to move into two different areas of testimony: first and foremost, the overview of security affairs that crosscuts the entire DOE, and second, the testimony addressing these offices with the four programs that I am responsible for.

As you will notice, nuclear weapons, materials and information are at the focal point of our program. They are involved in all matters of our activities.

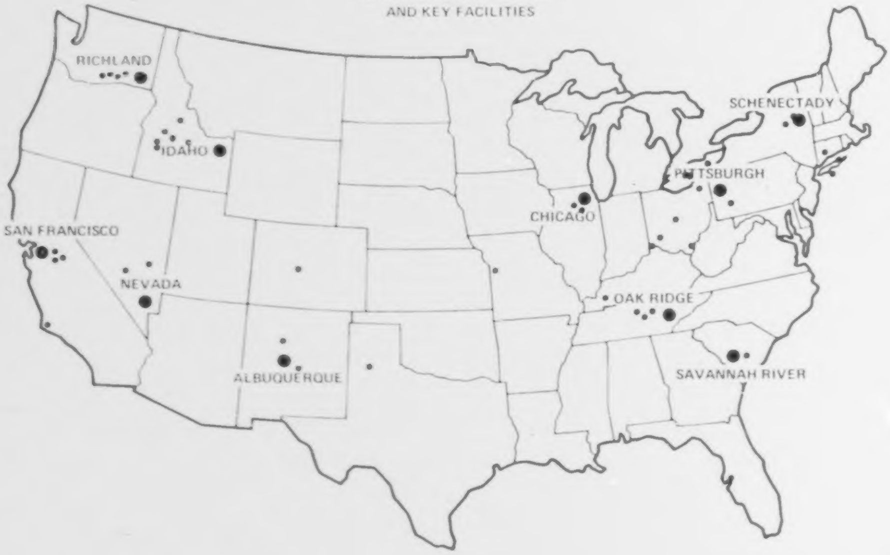
The Office of Classification has a small group of about 33 people, some of the most dedicated professionals I have ever seen. These people have to have scientific backgrounds. Unfortunately a lot of people portray them as people with green eyeshades. That is not the case. They are very deliberate, hard-working people. [Deleted.] I will be looking at Classification very hard in the coming year to determine how we can do that job better.

In the case of safeguards and security, I am sure each of you is well apprised of the situation in the past in the Department of Energy where we found we needed to do things better. We are now doing those things better. The other day Mrs. Holt, at the beginning of the testimony, asked the question, "Are we getting well?" I am going to answer that question and pose a few other questions that I will answer for you today. They are the questions that are my theme of what we need to do in the security affairs business to improve our status.

I will pose those questions to you in a few minutes when I orient my presentation to security and a little bit more. But understand that in each of these areas, we take on the policy of what to do, how to protect ourselves, how to look at the adversary, how to look at the Soviets, and to determine how in fact we are going to conduct research and development activities and utilize our resources. Using this approach, we also have a tie-in with industrial security, international security affairs and with the intelligence community.

Here today is Deputy Assistant Secretary for Intelligence, Mr. Charles Boykin, who will respond if you have any questions in the intelligence area.

DOE OPERATIONS OFFICES
AND KEY FACILITIES



Though you have seen this map many times before, I would like to show it to illustrate the scope of our responsibilities. The important point is that we are widespread geographically. But more importantly, sir, the map indicates our 59 most critical installations of some several hundred. And each and every one of them is separate and unique and must be singly addressed. Now, in the security business—and I want to spend the next 10 minutes upon this and how through the crosscut we are taking care of the security problems, safeguards problem and how we are managing it—we are looking at places like Oak Ridge here, which has a fabrication facility. They have a production facility. We have reactors here. Of course, we have the scientific community up here in the Schenectady area, looking at research and development activities associated with naval reactor cores for surface and subsurface vessels.

Look at Nevada, at the test site. We have very unique responsibilities there because at times we have a nuclear weapon hung up before we put it down in the hole to do a test. As we get along a little further, we will talk about the various actors that are involved, what is the threat involved, what is the risk, what are our concerns. At San Francisco, of course, we have Lawrence Livermore National Laboratory one of the outstanding national labs. We have Los Alamos National Laboratory and Sandia National Laboratories in Albuquerque. These three national assets are not only national labs, but extremely important assets to the security and safeguards business. Without them we couldn't solve problems as computer security, as the R&D effort, or the development of the sensors that we put on the space shots so as to look at the Russians to find out what's going on on the other side.

So protection of those facilities is necessary. Richland efforts are related to plutonium. But we have come up with a management program which allows us to address all these problems which I will discuss with in just a few minutes.

MAJOR CONCERNS

Disruption of the Nation's stockpile: Maintenance of current stockpile; new production.

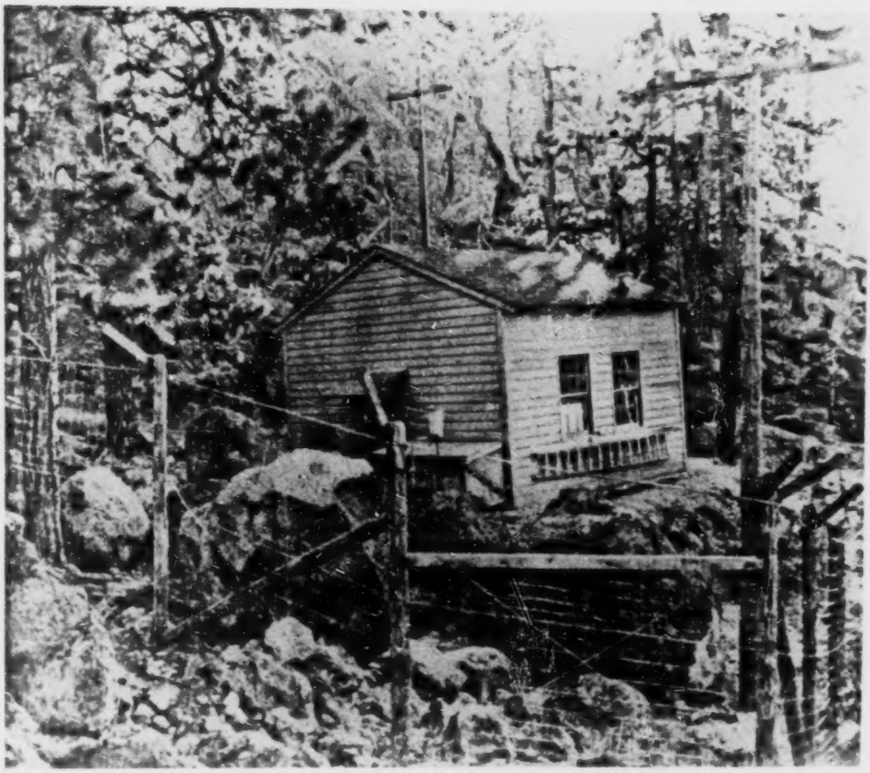
Disruption of materials production activities.

Political coercion/embarrassment.

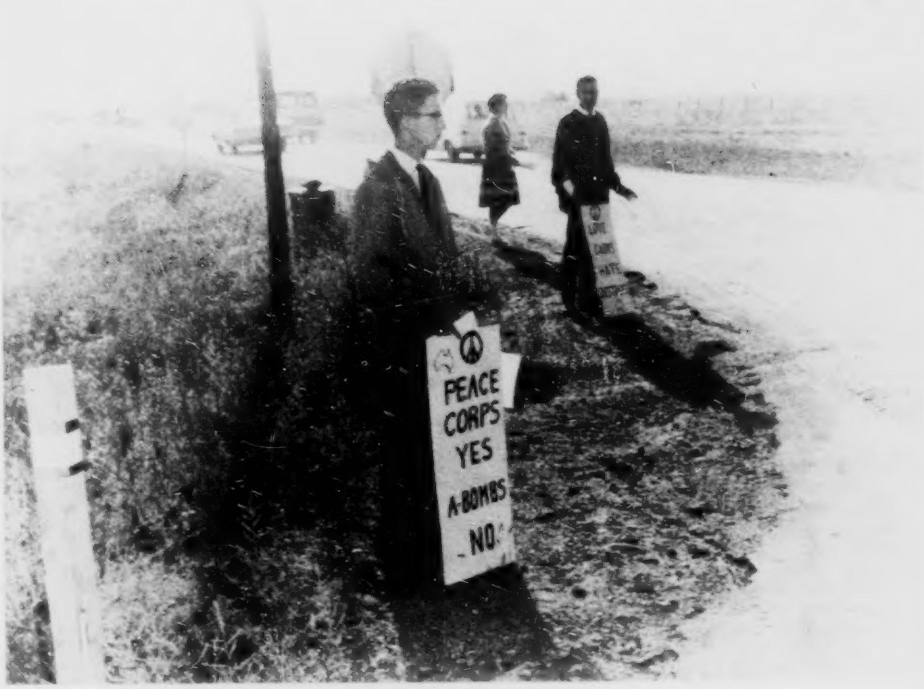
Endangering public health and safety.

What are our major concerns? I have listed some generic ones here. They go across all of the three offices I described to you. These offices, if you will just keep in mind, will be discussed later. These are our obligations, if you will.

Now, I will move into the security area particularly and talk a little bit about perceptions. Now, there is no doubt in my mind that each member of the committee is well aware of the potential threat.

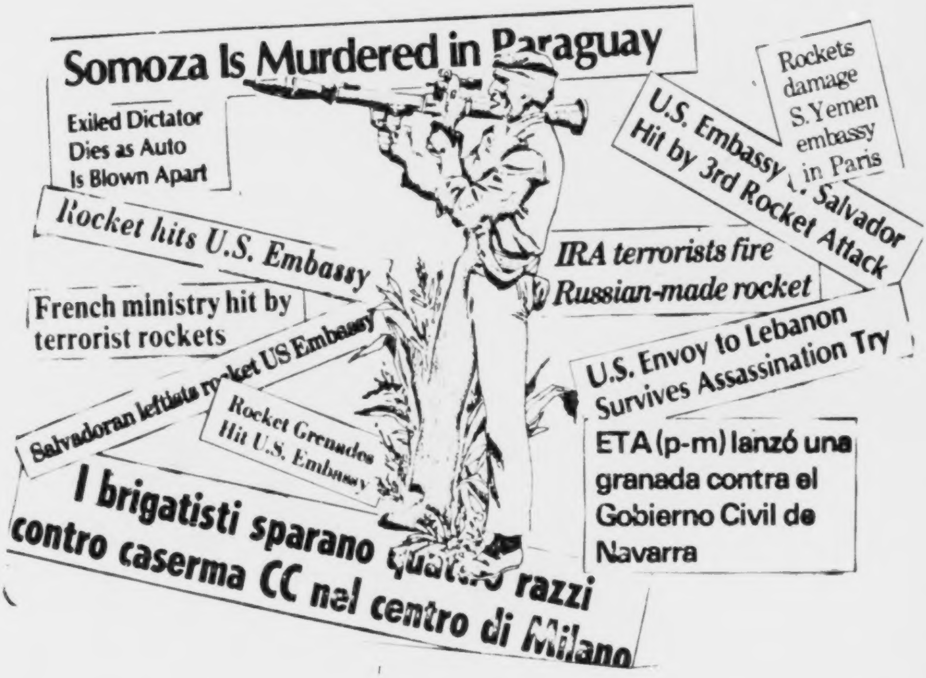


However, there are a lot of people in this country who still think that security at the Department of Energy looks something like this, and that the threat looks something like this.


PEACE
CORPS
YES
A-BOMBS
NO

This is no longer the case.

Now we have moved up a step to where we have other types of people with other types of motivations involved.



Somoza Is Murdered in Paraguay

Exiled Dictator
Dies as Auto
Is Blown Apart

Rocket hits U.S. Embassy

French ministry hit by
terrorist rockets

Salvadoran leftists rocket US Embassy

Rocket Grenades
Hit U.S. Embassy

I brigatisti sparano quattro razzi
contro caserma CC nel centro di Milano

Rockets
damage
S.Yemen
embassy
in Paris

U.S. Embassy in Salvador
Hit by 3rd Rocket Attack

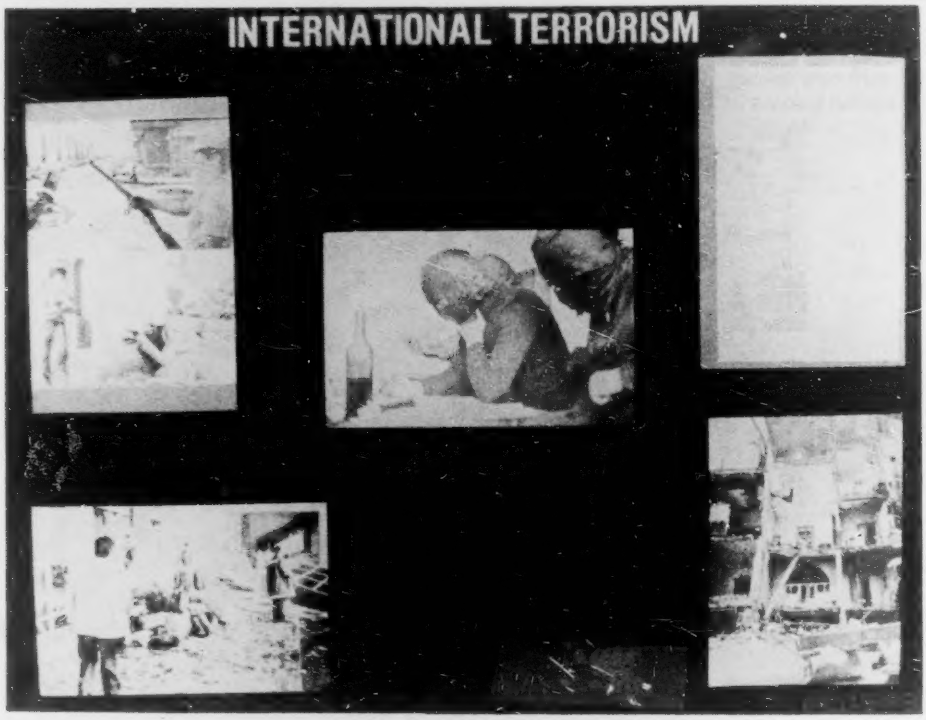
IRA terrorists fire
Russian-made rocket

U.S. Envoy to Lebanon
Survives Assassination Try

ETA (p-m) lanzó una
granada contra el
Gobierno Civil de
Navarra

But we can still cope with that. However, look at the industrial base now. It is sophisticated. It's dynamic. It needs to be protected.

And particularly when you think about those things that we do.



INTERNATIONAL TERRORISM

Let's think about the threat around the world. The fact is that this country may not always be able to be privileged to be as free as it is today. We have these kinds of problems all over. In my past position, information about 75 or 80 events per week came across my desk. Many of these events of terrorism in the United States are scarcely made public.

HARVEY'S
AUGUST 26-29, 1980

NO PARKING
SLIDE 12

This illustrates what could happen. The dynamics here where there is destruction, the threats are the type of thing that people in this country——

Mr. Stratton. Mr. Secretary, I think you are giving us something that we are familiar with already, what the problem has been, as we have pointed it out. You say you are new to the operation.

Mr. Cook. Right.

Mr. Stratton. Mr. Dingell has been complaining that the whole area, the whole operation of nuclear weapons is being improperly protected and guarded. Presumably as a result of that something has happened in the last year in the Department of Energy to improve the security situation.

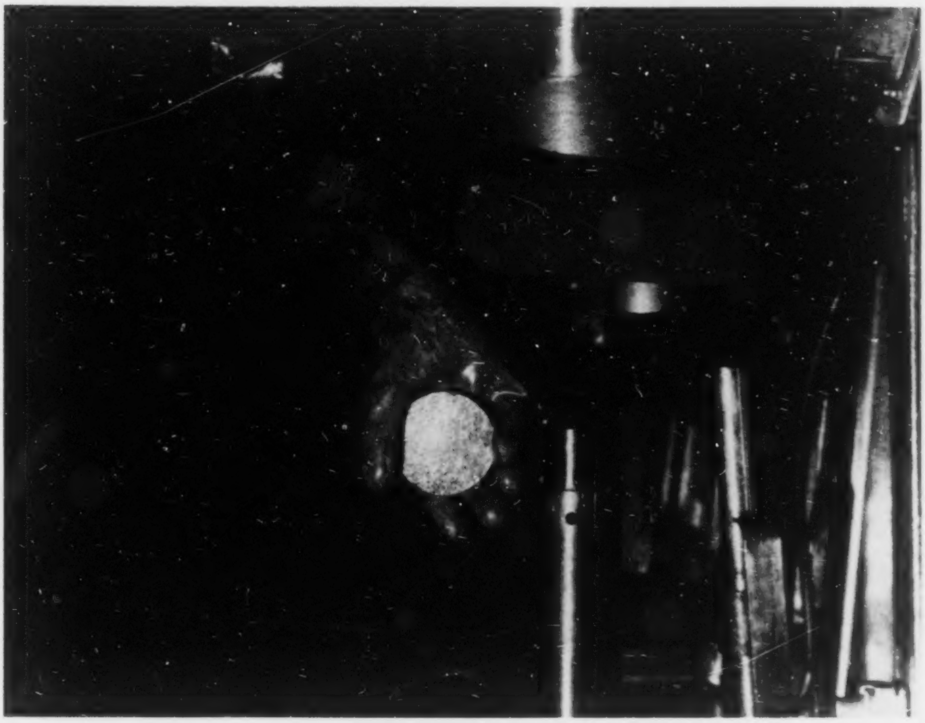
Mr. Cook. Yes, sir.

Mr. Stratton. And what we want to know is what are these new things that you have done, and what impact does that have on the budget.

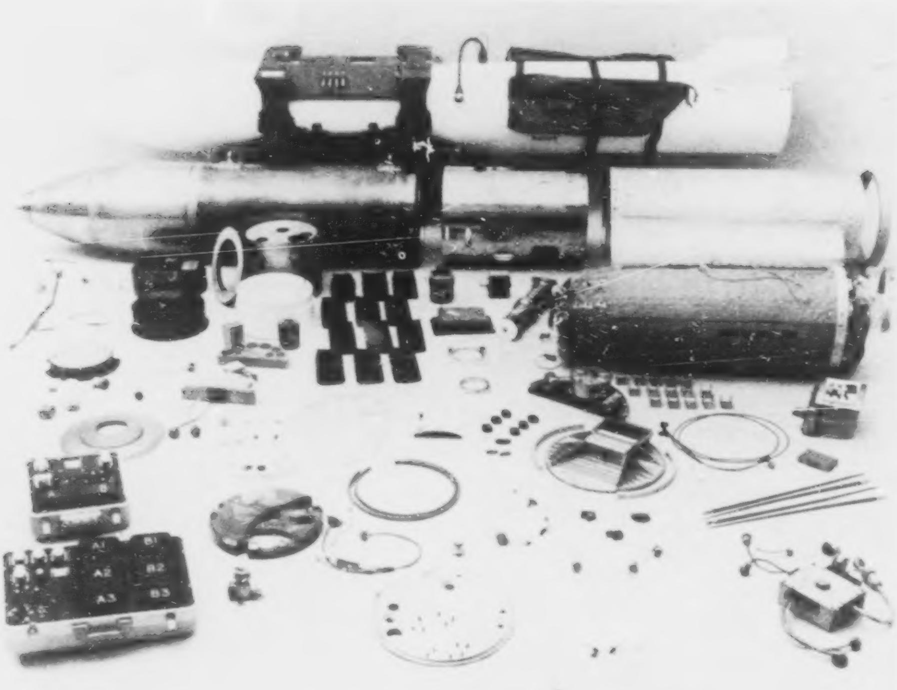
Mr. Cook. Yes, sir.

Mr. Stratton. So I think we can kind of digest some of this stuff and get to the real nitty-gritty.

Mr. Cook. Yes, sir. Let me proceed because here is a part of the threat, if you [deleted]. Now, when you look at a threat, you look at what you can do physically to keep people out. When you have someone inside, you have a different problem altogether. This is a part of the problem that we must take on. A little bit further on you will see why I am concerned about the insider threat. We can no longer be satisfied with the external protection provided by guns, barriers, and guards, and other similar components. We have to have an in-depth, integrated system because we have targets such as plutonium buttons within our facilities.



We have these attractive targets such as parts to the weapons as shown in this viewgraph.

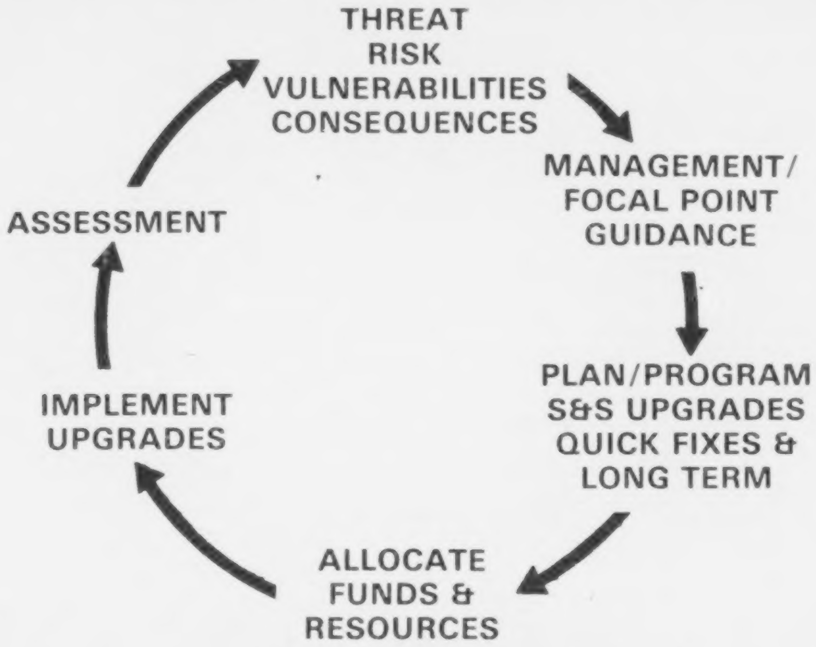


[Deleted.] We must make sure that we do guard these things as Mr. Dingell wants us to.

MAJOR LESSONS LEARNED

Now, in the past we have learned certain things. From these lessons we are taking action. We are funding against these types of actions. On corporate commitment I will make a specific comment. The corporate commitment and the leadership of the field office managers, the laboratory directors, our contractors has been superb. I really have no fault with that.

MANAGEMENT AND EVALUATION PROCESS

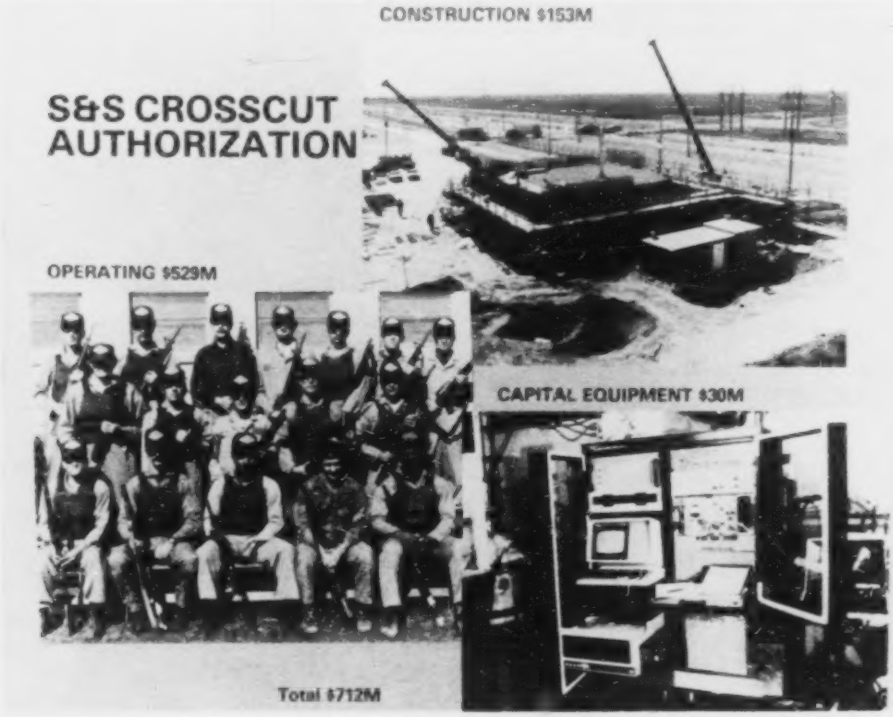

THREAT
RISK
VULNERABILITIES
CONSEQUENCES
MANAGEMENT/
FOCAL POINT
GUIDANCE
PLAN/PROGRAM
S&S UPGRADES
QUICK FIXES &
LONG TERM
ALLOCATE
FUNDS &
RESOURCES
IMPLEMENT
UPGRADES
ASSESSMENT

Let me give you an example of how we are taking things on, how we are saving money, how we are realistically looking at the situation. If a DOE order says something is a threat, what is the first thing that the people in the field are going to do? They are going to make everything maximally protected. That is human nature. Now, I suggest to you we have a spectrum of facilities. At one point of the spectrum we have a dynamic fabrication facility where we make the weapon itself. At another point you may have a production facility, where in fact the product could hardly be given away. Do you need the same levels of protection at both? You obviously do not.

Now, should we spend millions of dollars on the latter, or should we spend them on the former? We have this type of a situation which has never been looked at before. We have applied one yardstick to it before, and that is threat. Now, when you put a measurement against a facility that takes into consideration risk, vulnerabilities, and consequences, you then have a template by which you can come up with a logical, common-sense cost-effective approach.

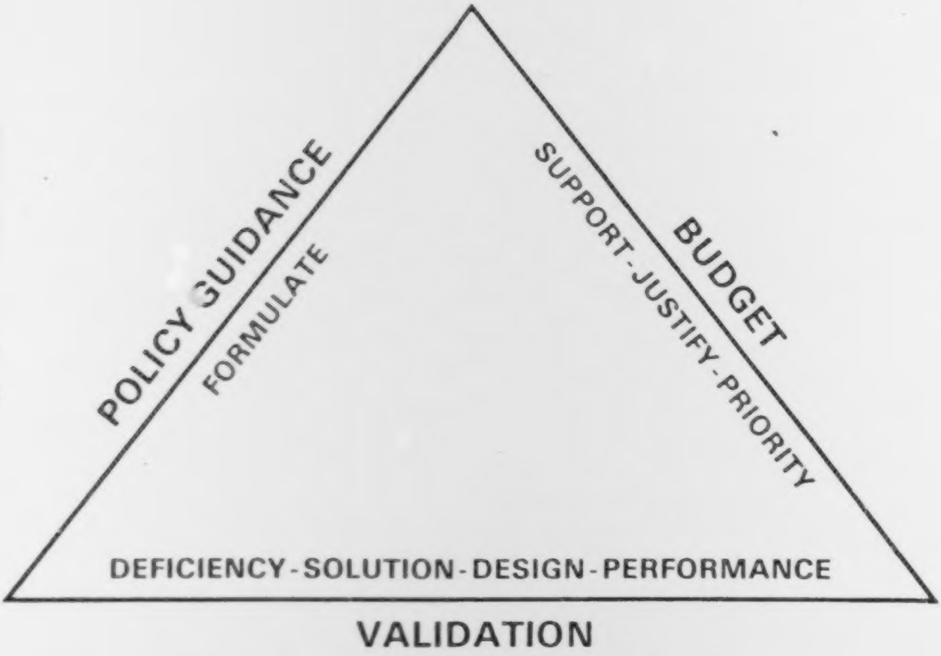
We then use this template at every facility. Out of it falls what we can call a master security and safeguards agreement which I cosign. This agreement provides our inspection and evaluation teams the baseline against which to measure us. That is where Mr. Dingell and others, to include myself, are concerned. General Hoover, the other day, talked about testing ourselves, stressing ourselves, seeing where we break. This is how we measure and test ourselves. Then we fix the problems identified.

Now, sir, I mentioned the crosscut. I mentioned the crosscut earlier and I hesitate to proceed because I don't want anyone to miss this.


CONSTRUCTION $153M
S&S CROSSCUT AUTHORIZATION
OPERATING $529M
CAPITAL EQUIPMENT $30M
Total $712M

Mr. Cook. The crosscut shows the funding commitment across the entire Department of Energy, a total of $712 million in authorization for construction, operating, and capital equipment. That is a lot of money. That is a lot of coordination, it is a lot of commitment.

FOCAL POINT



In order to oversee this, we have a focal point, the Office of Safeguards and Security. That office is, in fact, responsible for making sure it facilitates these activities, that we assist field office managers and save money in each and every case where we can.

Mr. Stratton. What have you done differently from what you did before?

Mr. Cook. I am about to get to that.

Mr. Stratton. I think we would like some facts, some hard facts.

Mr. Cook. OK, sir.

Mr. Stratton. Dr. Mansfield, yes?

Dr. Mansfield. Is it true that the arrangement of a security agreement with each site is a new thing?

Mr. Cook. Yes; absolutely a new thing. We initiated that February 1, 1985. We have three sites which have volunteered to prototype the agreement: the Idaho Operations Office, Pittsburgh Naval Reactors, and Lawrence Livermore National Laboratory.

Dr. Mansfield. This will serve as a basis for the next year to measure actual achievements?

Mr. Cook. It will serve as the agreement and commitment between management, if you will, and the field as to what specific threat concerns each field facility manager has agreed to that requires protective measures.

Now let me hasten to state this: We have not been standing still. I am about to show you a lot of good things. There is a lot of good news here.

Mr. STRATTON. Well, we want to get to that, because we are running out of time.

Mr. COOK. OK, sir. This depicts some of the good news.

Mr. STRATTON. We had a problem here a couple of years ago where the guards at Los Alamos were all 70 or 80 years old, and they weren't allowed to carry pistols. As a result of the committee's own investigation, we changed that situation. And, as you heard, or maybe you didn't, that situation, according to the Director, is much better. This is what we are trying to find out.

Mr. COOK. Yes, sir.

Mr. STRATTON. We know what the problems of protection are, but we want to know what you have specifically done to improve the situation on the basis of criticisms. We are not particularly enchanted with what Mr. Dingell has done, because he has been moving in on the turf of this committee.

Mr. COOK. I understand.

Mr. STRATTON. We are the ones that have the authority with regard to the protection of the defense aspects of the Department of Energy. But he has made a big thing, and put a lot of it to get out into the press, and we are trying to find out what you are doing to correct that kind of thing.

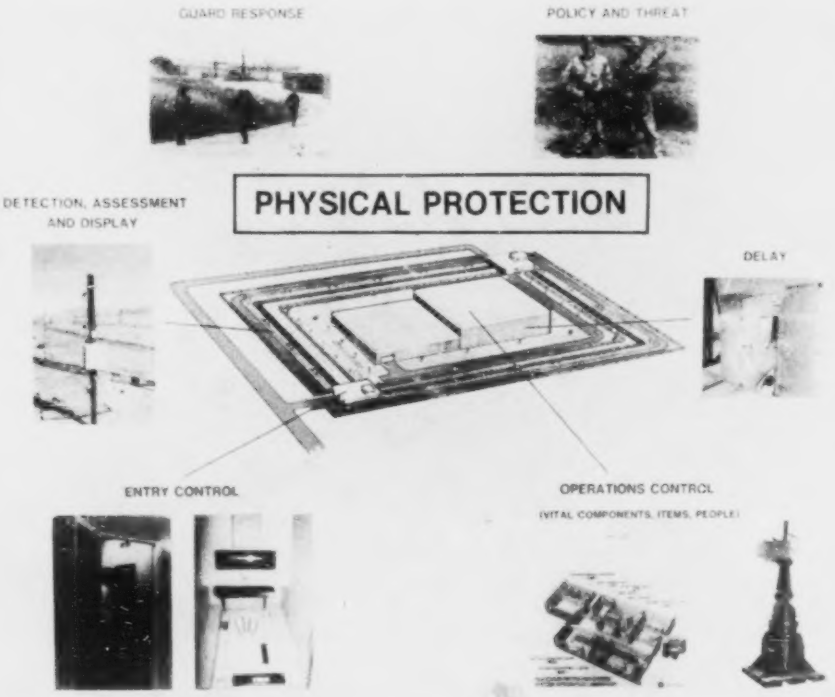
Mr. COOK. Let me show you exactly what we are doing.

Mr. STRATTON. We don't need a primer on security arrangements.

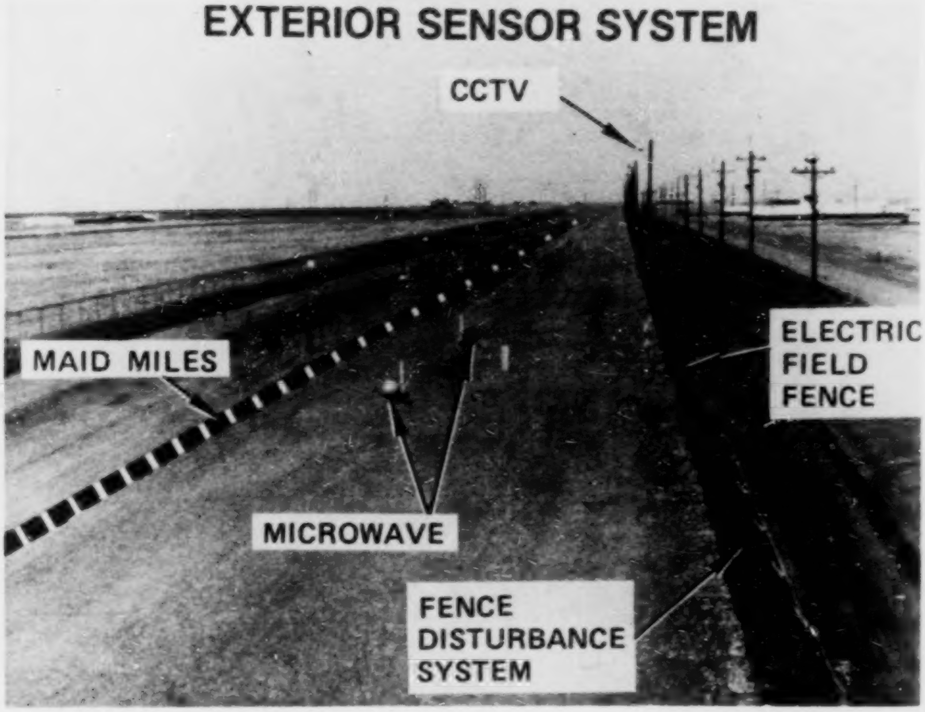
Mr. COOK. Let me show you exactly what we are doing. Dr. Kerr was exactly right. I will go a little bit beyond that. Some of our facilities have recently received high ratings from the Inspection and Evaluation team where we have stressed the system to the ultimate. This is a major improvement from the past.

Now, overall, what is the condition of the facilities in the Department of Energy? There are several answers to this, because you cannot just look at something called physical protection. It is much more complicated than that. Within the plant we have various problems. [Deleted.] We have material control and accountability. We have computers.

When we roll all that together, we have exactly what I think you are getting at. We have a composite system.


GUARD RESPONSE
POLICY AND THREAT
DETECTION, ASSESSMENT AND DISPLAY
PHYSICAL PROTECTION
DELAY
ENTRY CONTROL
OPERATIONS CONTROL
(VITAL COMPONENTS, ITEMS, PEOPLE)

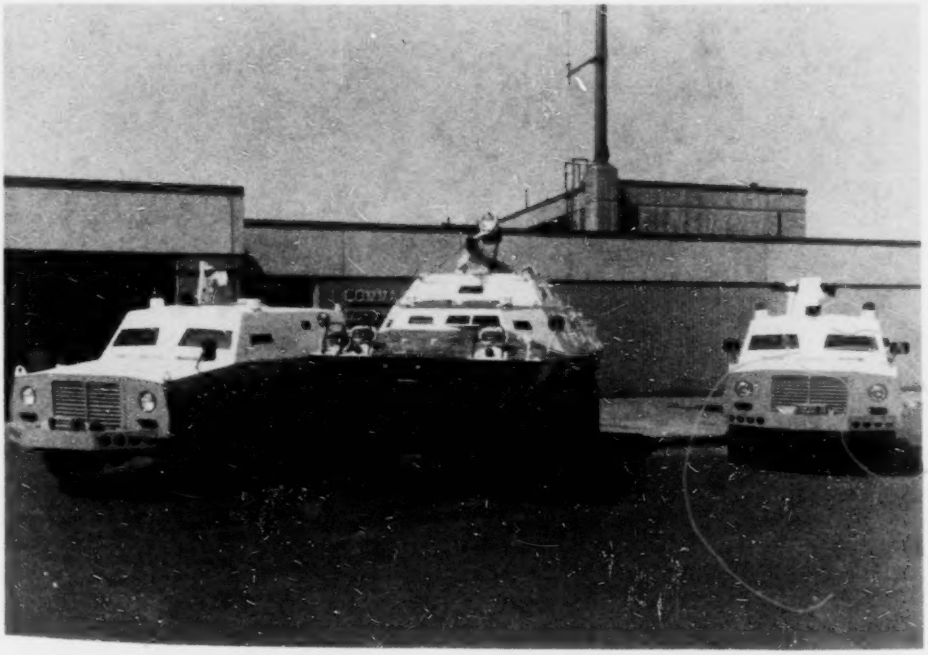
This is some of what we have done here, Mr. Chairman. Sandia Laboratories has been outstanding for the last 6 years in helping us develop systems to detect people. One of the systems, called PIDAS—perimeter intrusion detection and assessment system—has been placed at most all our facilities. Facilities not having PIDAS and requiring such a system are programmed to give a system in this year or next year.


EXTERIOR SENSOR SYSTEM
CCTV
MAID MILES
ELECTRIC FIELD FENCE
MICROWAVE
FENCE DISTURBANCE SYSTEM

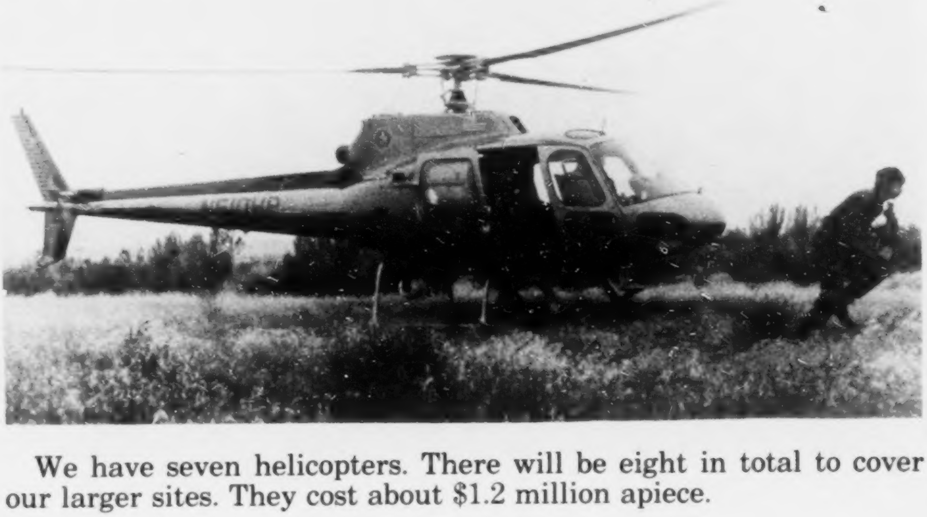
A PIDAS provides different types of sensors which result in a highly reliable detection system.

PROTECTIVE FORCE ARMAMENT
SR-12

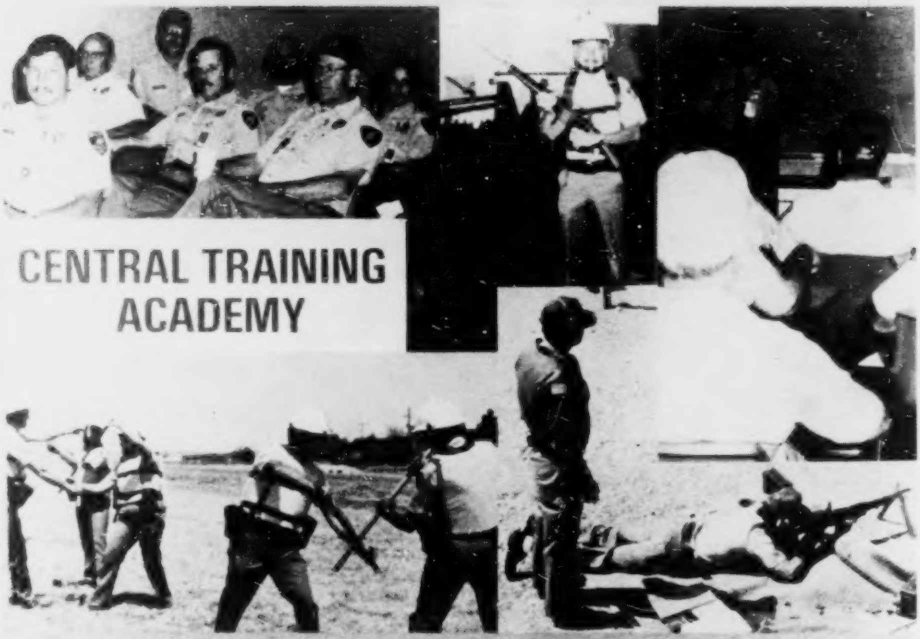
Another thing we have done is upgraded our armament. We no longer have a pistol and shotgun out there. Also, we have well trained, sophisticated, dedicated response teams. All this costs money.



We have armored carriers here. There is another version, the Viking, that Dr. Kerr talked about yesterday. We have proposals for Vikings to be utilized where they are required.



We have seven helicopters. There will be eight in total to cover our larger sites. They cost about $1.2 million apiece.


CENTRAL TRAINING
ACADEMY

We have started a Central Training Academy [CTA] which we want to make the most dynamic training center of its type in the world in the next 2 years. The CTA trains both the normal protective force and the SWAT teams.

SWAT TRAINING

This is an illustration of the SWAT teams. We are going to train about 800 people per year. Money, time, and effort are required. We have already trained about 400 people. We are developing the courses and at present we have seven.

AUXILIARY GUARD TRAINING

We also have to have auxiliary protective force training at these facilities because we can't count on external assistance in a timely fashion. So, in fact, we have nonprotective personnel members of the contractor that learn how to cope with incidents and respond accordingly.

Mrs. Holt. May I ask a question, Mr. Chairman?

Mr. Stratton. Yes, Mrs. Holt.

Mrs. Holt. The people that you are training there now, are they the employees of the contractors who come in?

Mr. Cook. Yes, ma'am.

Mrs. Holt. You have the right to train those people?

Mr. Cook. Yes, ma'am.

Mrs. Holt. For the contractor?

Mr. Cook. Yes, ma'am.

They are all for the program and support the program.

Mrs. Holt. You don't have any problems with that?

Mr. Cook. Not at all. If so, they haven't surfaced yet.

Mr. Stratton. Dr. Mansfield?

Dr. Mansfield. In scanning your list of accomplishments for the year, in your prepared testimony, I did not notice any initiatives for personnel reliability, human reliability programs.

Mr. Cook. Yes.

Dr. Mansfield. [Deleted] can you comment on whether or not you are going to have human reliability programs, something like the military has?

Mr. Cook. Yes, thank you.

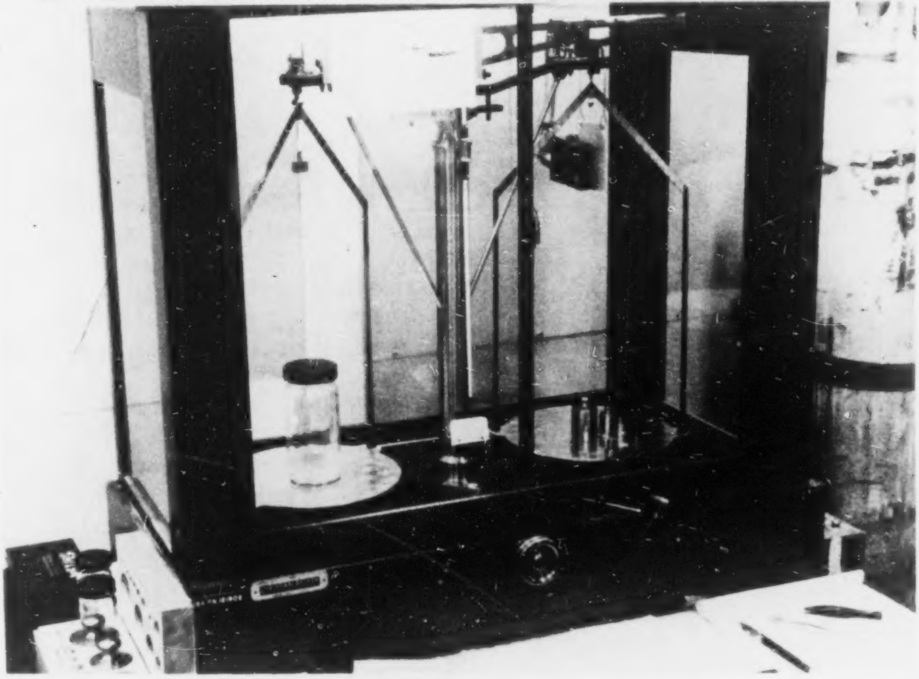
Today we have a program in the DOE Office of Military Applications called the Personnel Assurance Program [PAP]. However, that started out as a safety function and only deals with the hands-on people. What we need here, sir, is a system whereby management and supervisors can look at the type employees that are employed in these most important and delicate areas to make sure that any change of personality and the like is noticed and can be identified quickly.

We are working right now on a human reliability program. Whether that will be dovetailed with the PAP or replace the PAP, we yet don't know. We are still researching the matter and looking at its legal ramifications, how the unions will look at it, and so forth.

Dr. MANSFIELD. But you will report on that this year?

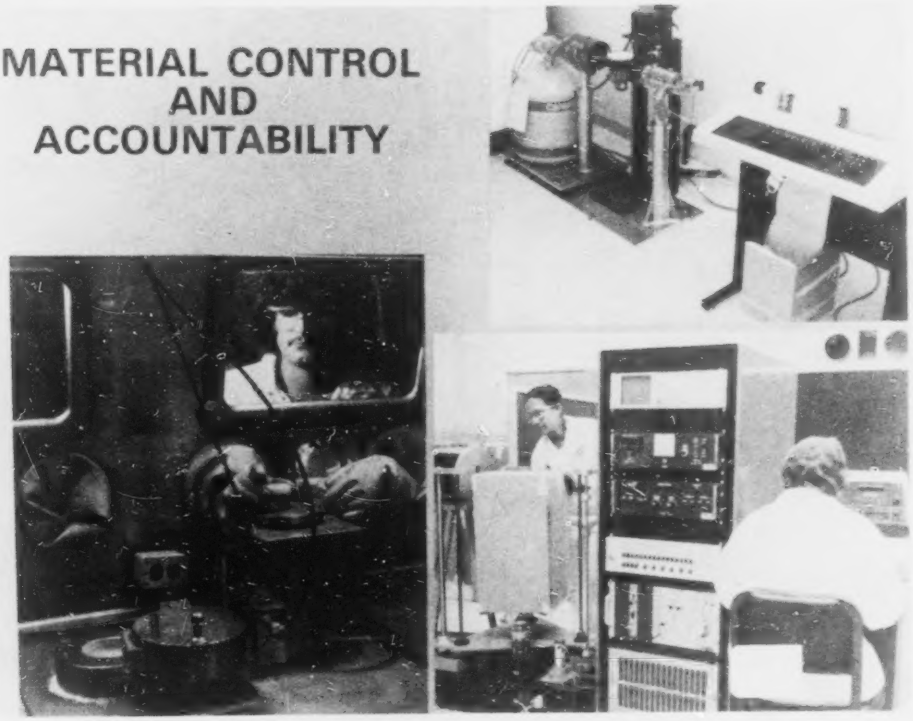
Mr. COOK. That is right.

MATERIAL CONTROL AND ACCOUNTABILITY STANDARD

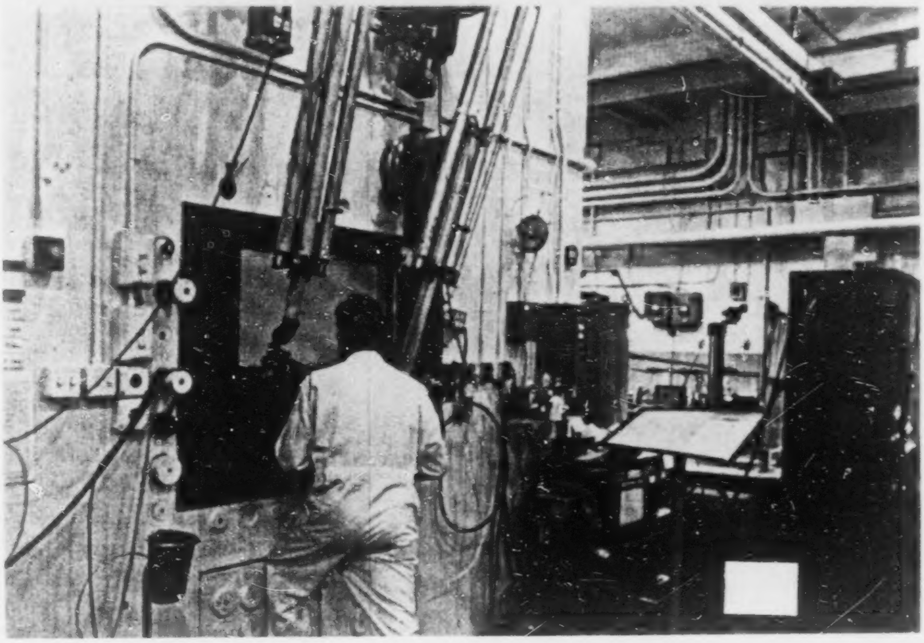


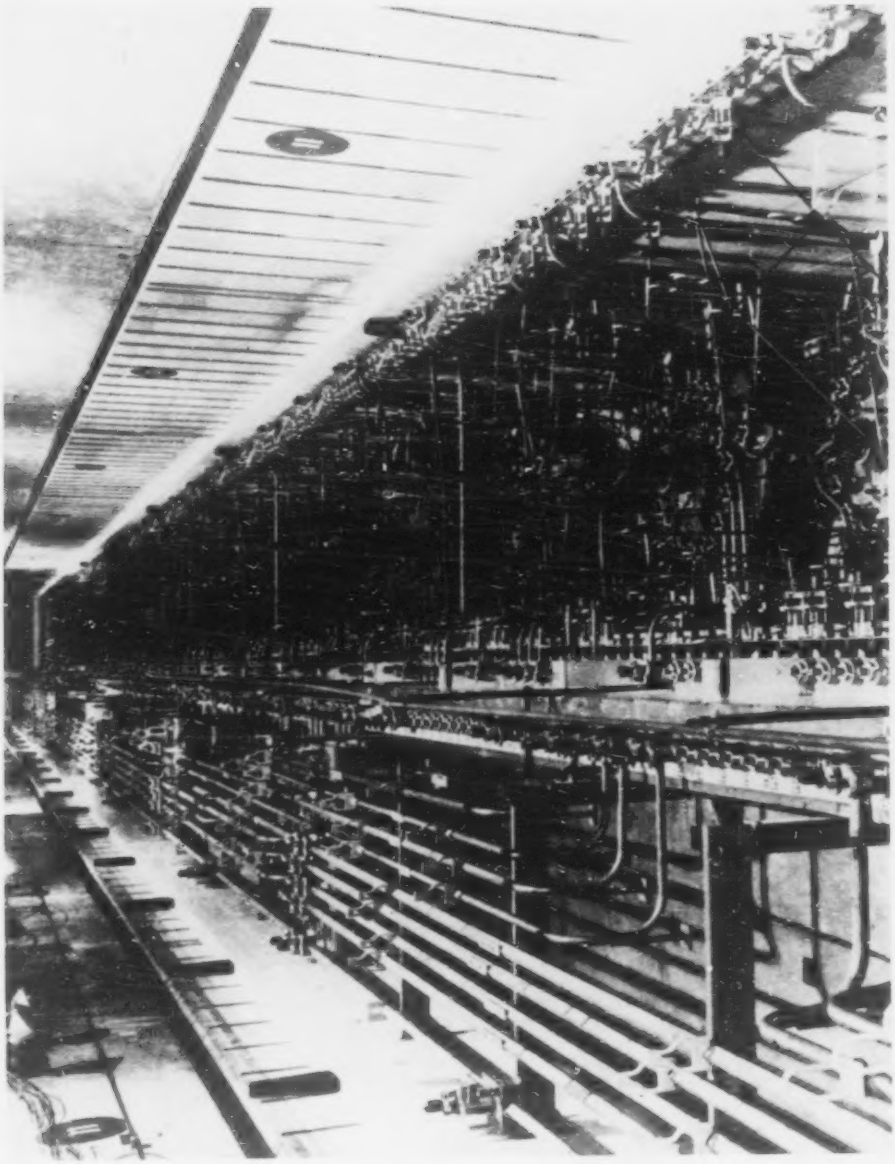
Sir, now this is material control and accountability. It is important because we must know how much material we have and we must be able to control that material and account for it.

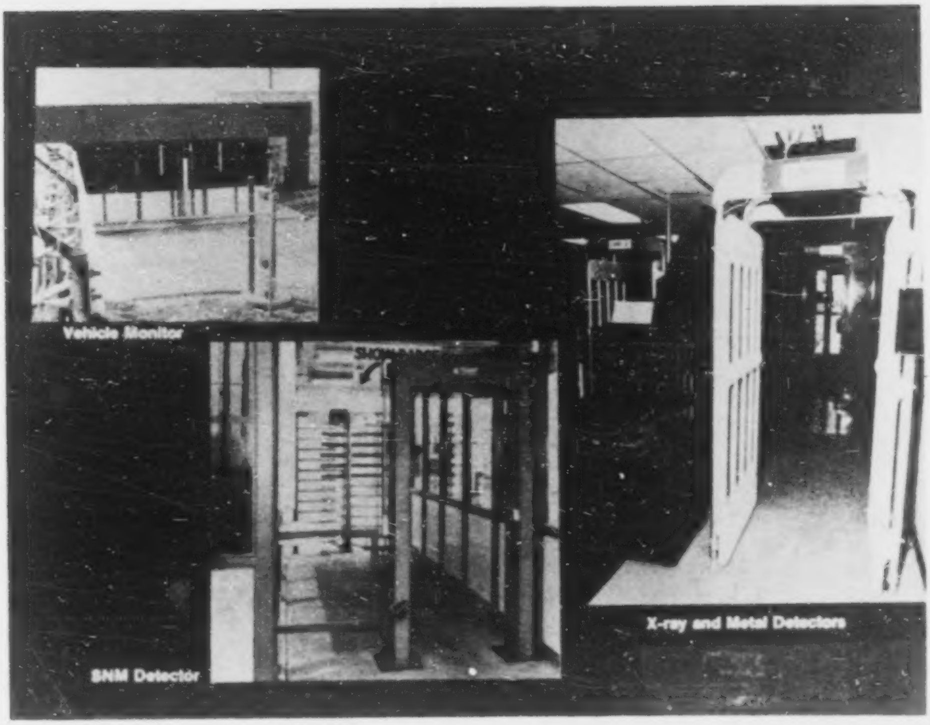
MATERIAL CONTROL AND ACCOUNTABILITY



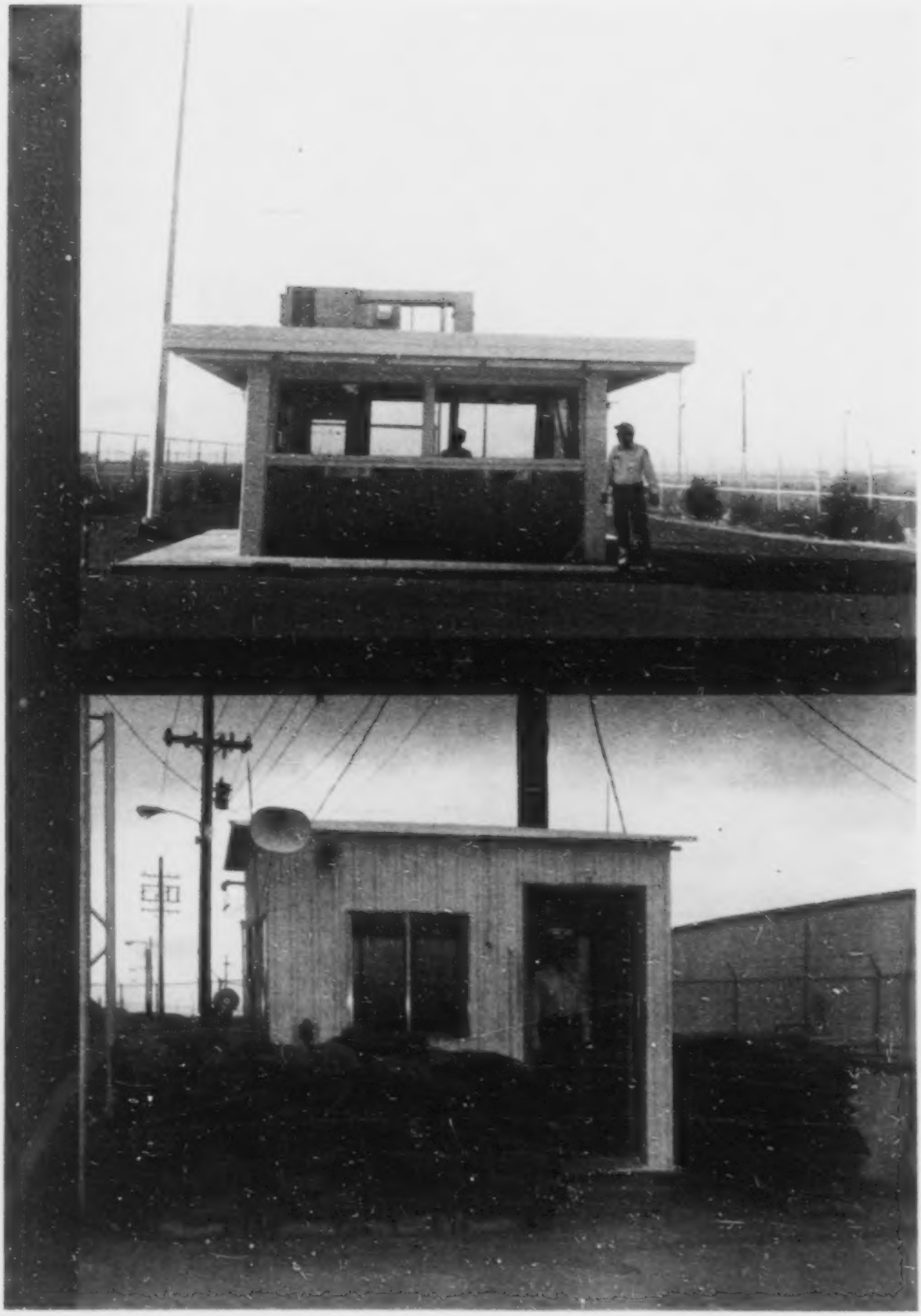
SPECIAL NUCLEAR MATERIAL HANDLING



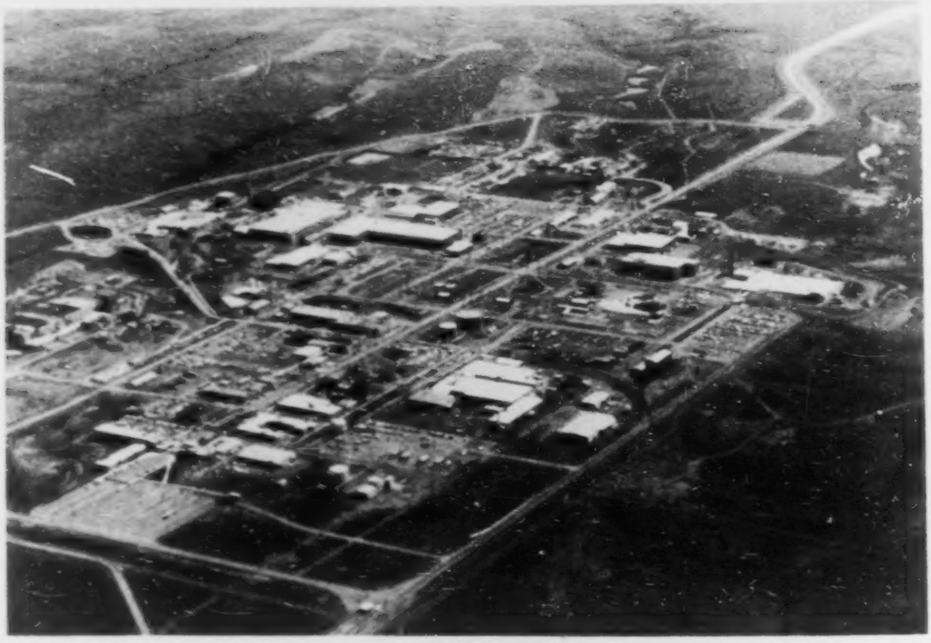



Vehicle Monitor
SNM Detector
X-ray and Metal Detectors

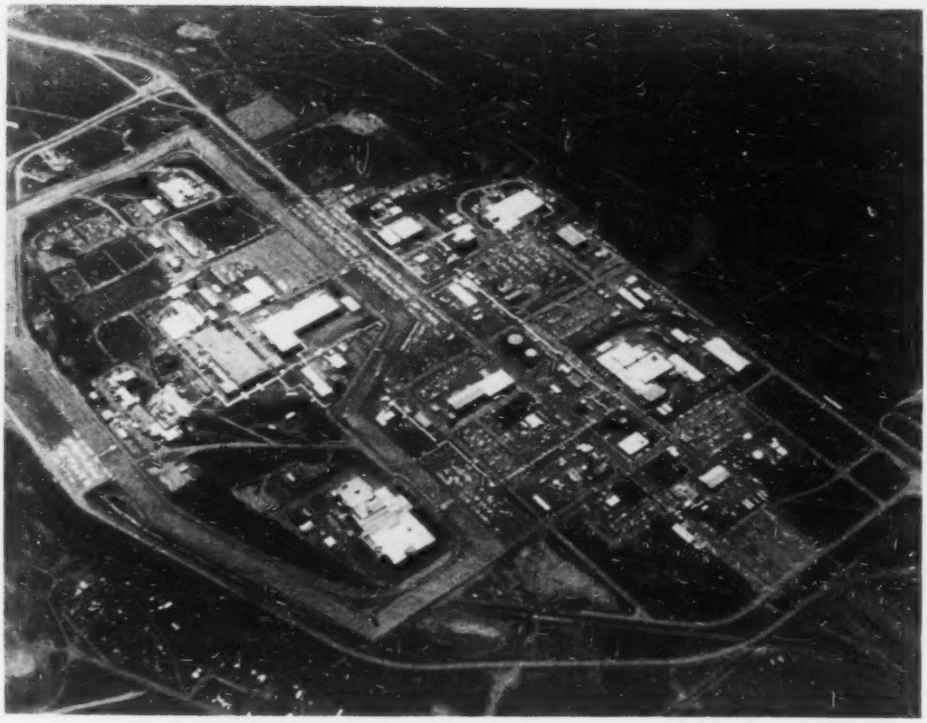
These are some of the expenditures that we will need to make to control and account for materials. Material control and accountability helps us detect and protect special nuclear materials. We rely on these systems to ensure special nuclear materials only leave the plant when authorized. This is our objective.



These are some of our new construction achievements. On the bottom, you will see the old; on the top, the new. [Deleted.]

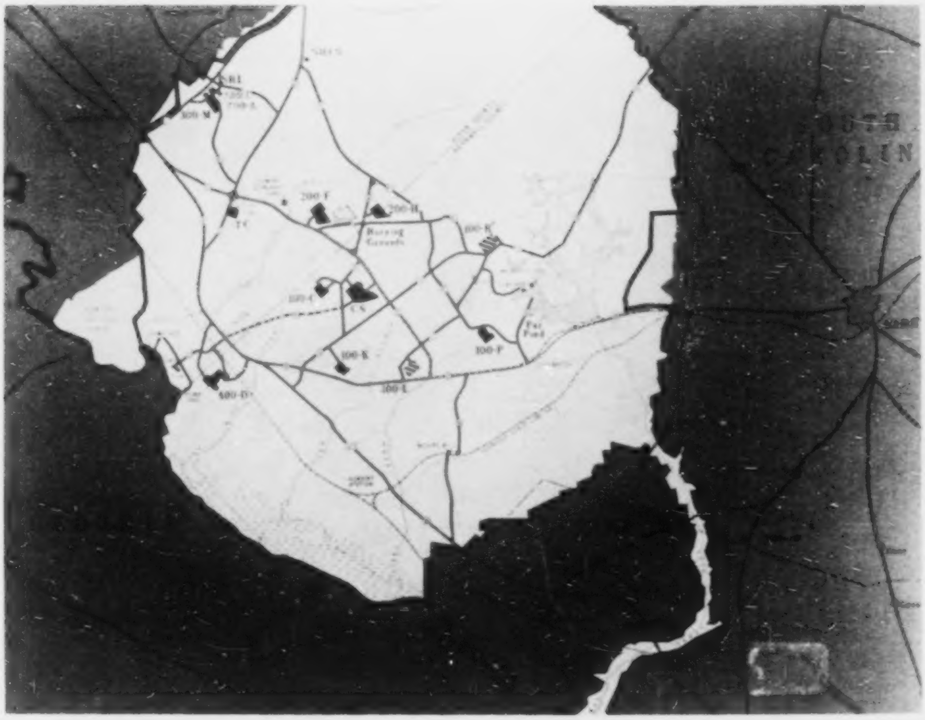


This is a view of Rocky Flats before the installation of a PIDAS. On the other side of the line right down the center you will see where we constructed the PIDAS.

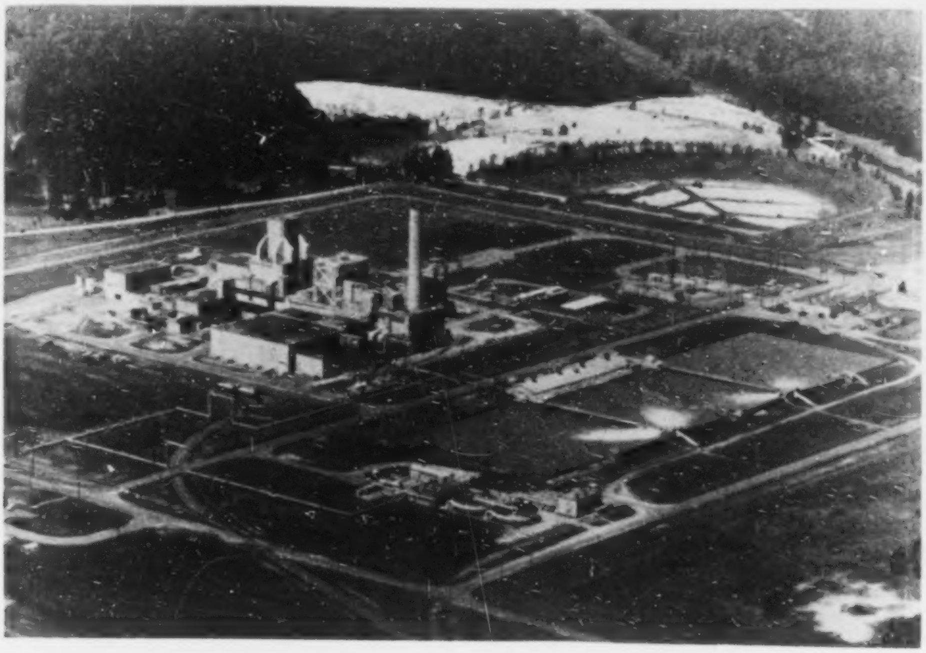


You will notice the entire PIDAS. The PIDAS provides for detection at a high confidence level. Once we have that detection capability, our guard force can assess the problem using closed circuit television.

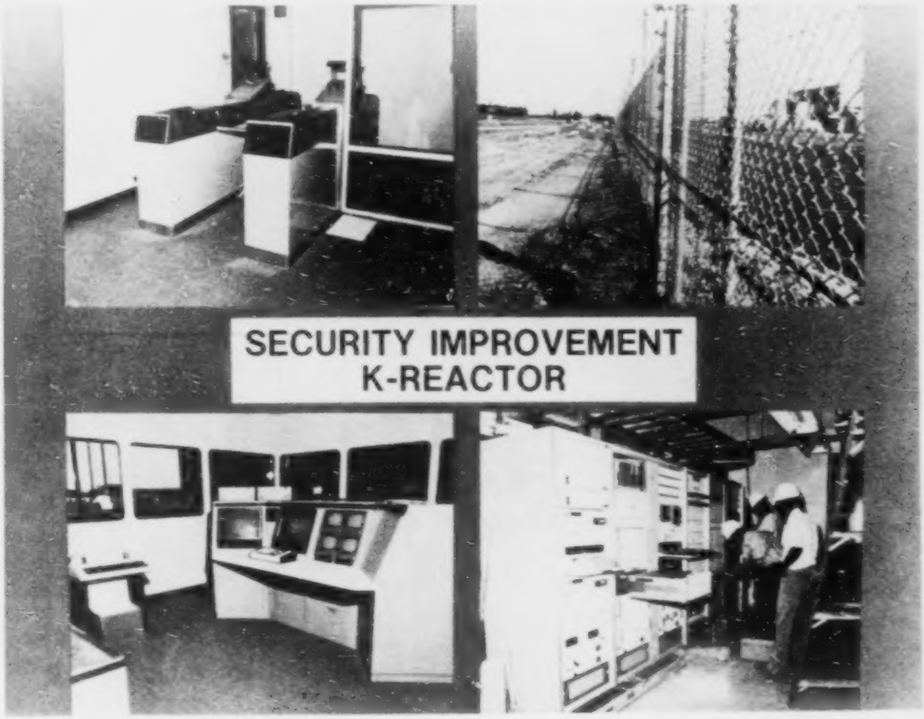
We then will have certain amounts of delay built in, based upon how much delay we think we need for the response force to arrive.

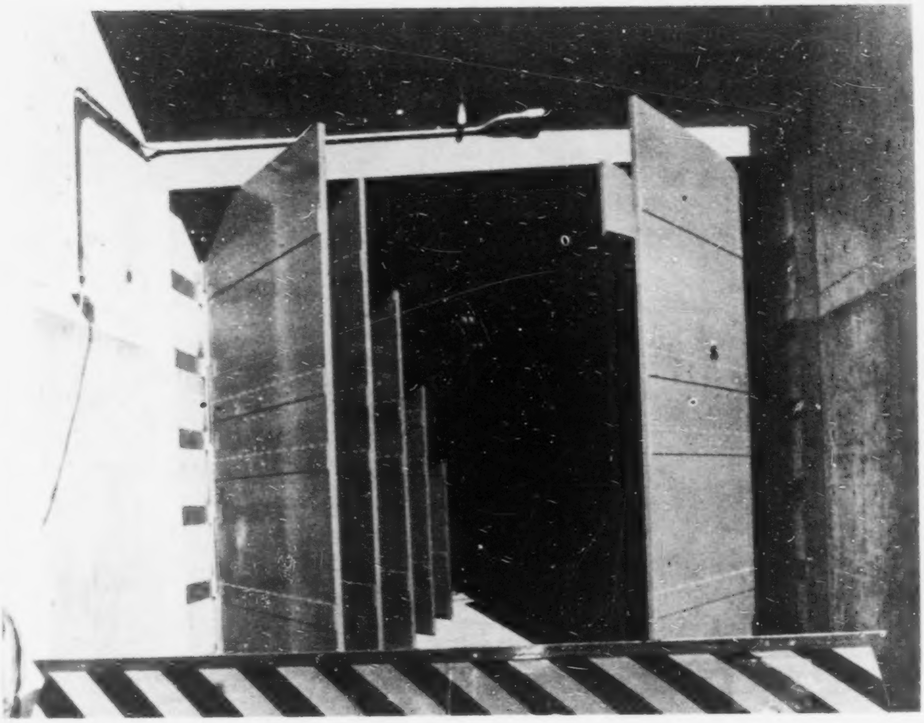

SRL
300-M
200-F
200-H
TC
Burning Grounds
100-R
100-C
CS
100-K
100-L
100-P
Par Pond
400-D
OUTH
OLIN

This is a map of Savannah River. I show it only because I want to show how big Savannah River is and the fact they do have a couple of helicopters there. This is the K Reactor at Savannah River now being upgraded.



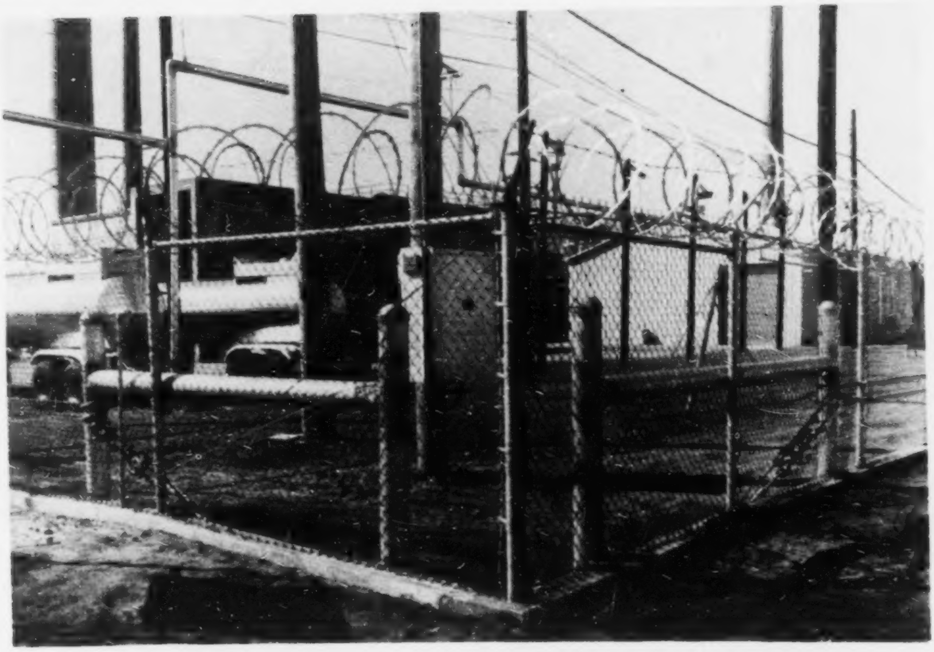
This shows the PIDAS and other physical protection component. This is an upgrade that has already gone in there. Notice the entrance portals on the facility.


SECURITY IMPROVEMENT
K-REACTOR

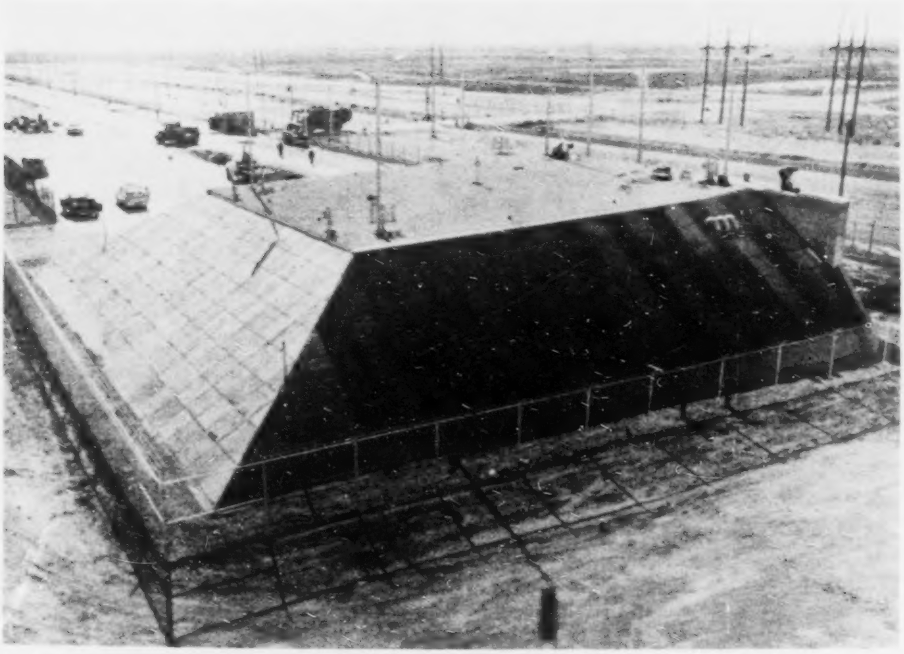


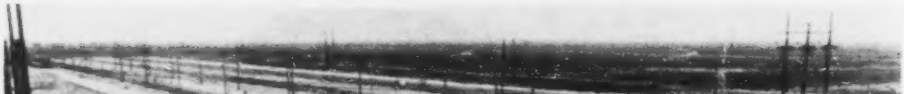
This is a facility at Idaho.

You have five doors here. [Deleted.] So you see it takes ingenuity to determine what, in fact, we have to do to keep the other side out.

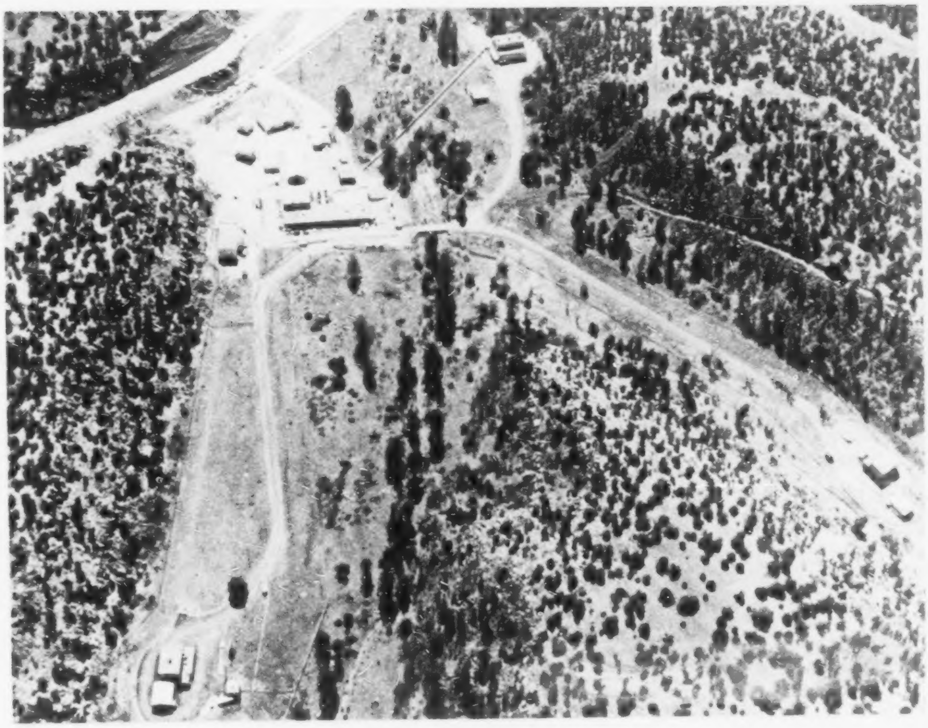


This is an example of razor tape on the top of the fence, a new fence here. Notice the concrete is below ground, making it very difficult to dig under. We have aircraft restraining cables here. We have the corner reinforced fence posts. People like to drive through the corners because they think the corner is the weakest point.

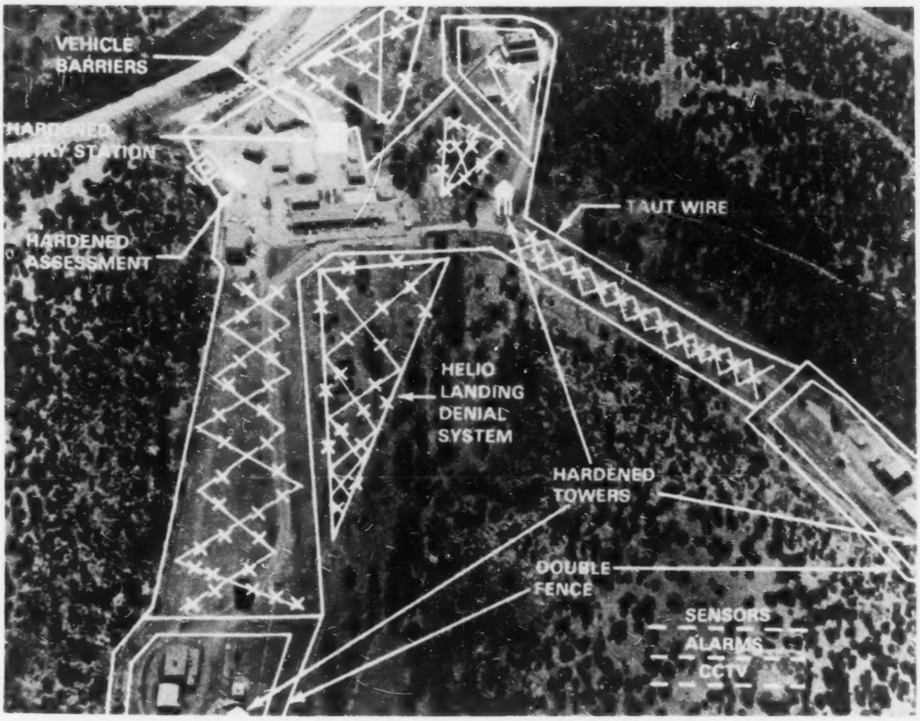




Here is some more good news. What you see at the bottom is a special nuclear materials storage vault. What you see at the top is how it looked 7 weeks later. This is what you call commitment, energy and so forth. It is pretty tough to get into this place right now. It is these types of improvements that we are trying to make.



Dr. Kerr, yesterday, talked about his facility here. These three buildings you see in the lower corner are called Kivas, Indian for cooking place. The area is wide open. We want to keep aircraft away from it; we want to deny people access as much as we can.


VEHICLE BARRIERS
HARDENED ENTRY STATION
HARDENED ASSESSMENT
TAUT WIRE
HELIO LANDING DENIAL SYSTEM
HARDENED TOWERS
DOUBLE FENCE
SENSORS
ALARMS
CCTV

Mr. COOK. That is what this does. Same picture. What you see here are aircraft denial systems. Hardened towers that have gone in here and here.

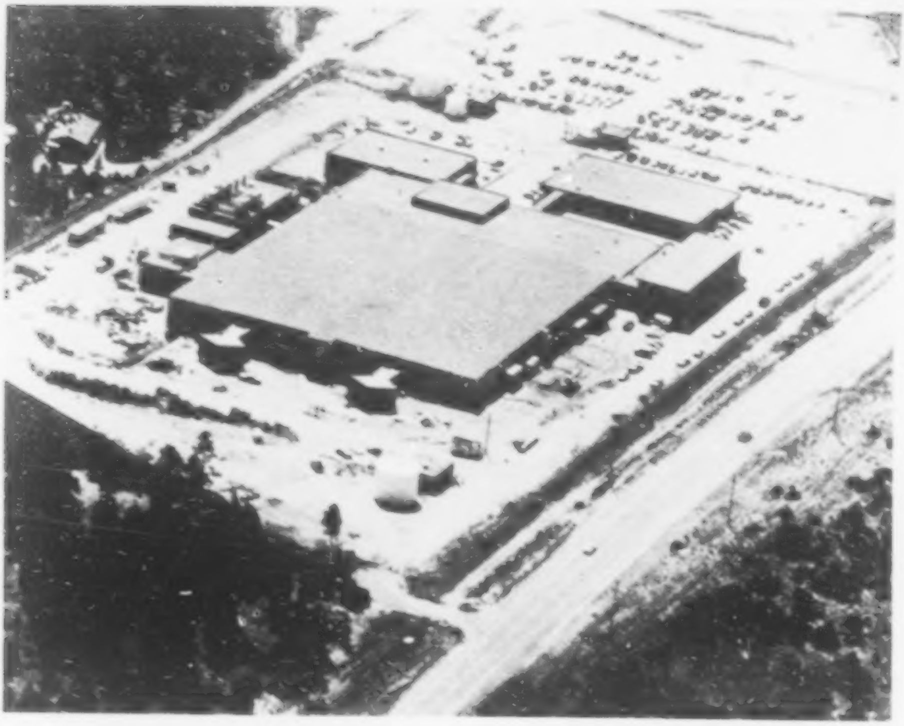
[Deleted.]

Mrs. HOLT. Mr. Chairman, is that something we have now?

Mr. COOK. That is in being. Yes, ma'am.

Mrs. HOLT. Where?

Mr. COOK. Los Alamos. We would love to show it to you.

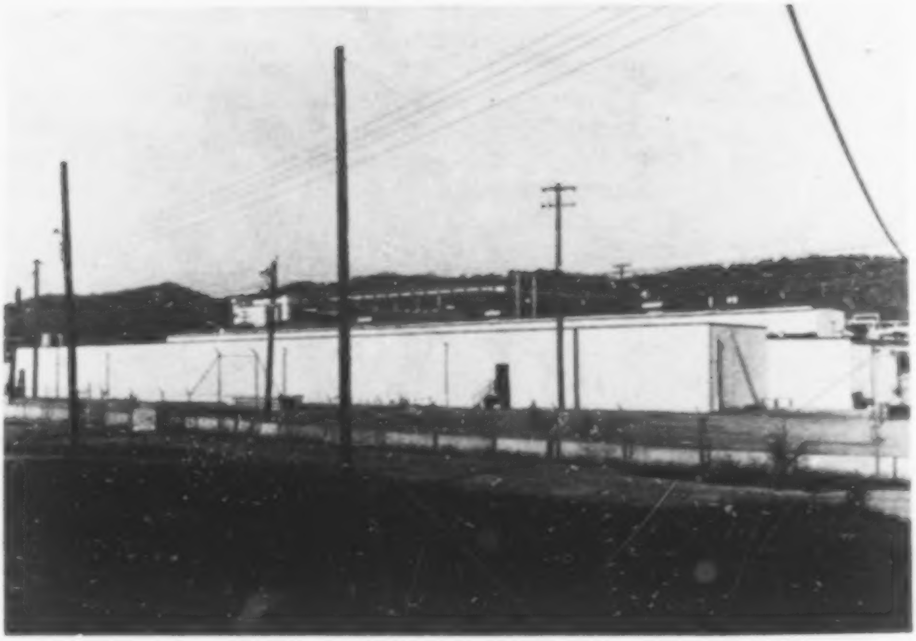


Here at Los Alamos is the plutonium processing facility.

You will notice these are aircraft denial type facilities using ½-inch nylon rope. No aviator in his right mind is going to land with that denial system in place.

Now, notice also we have a PIDAS. As a matter of fact, at the time this photo was taken, you can see the construction underway. This is the portal entry. It is a very secure type facility. It has CCTV and other security systems.

This is a facility at Oak Ridge before major changes. There are two vaults at least, maybe three in this building, but it is a normal industrial type building where we keep special nuclear material.



This is what it looked like after improvements were made: Gunite reinforced, closed up, gates gone, doors gone, and so forth. They are going to have to come after you in force, determined and committed and willing to pay the price to get to a place like that.

SNM AREA
ZONE 12-SOUTH
ZONE 12-NORTH

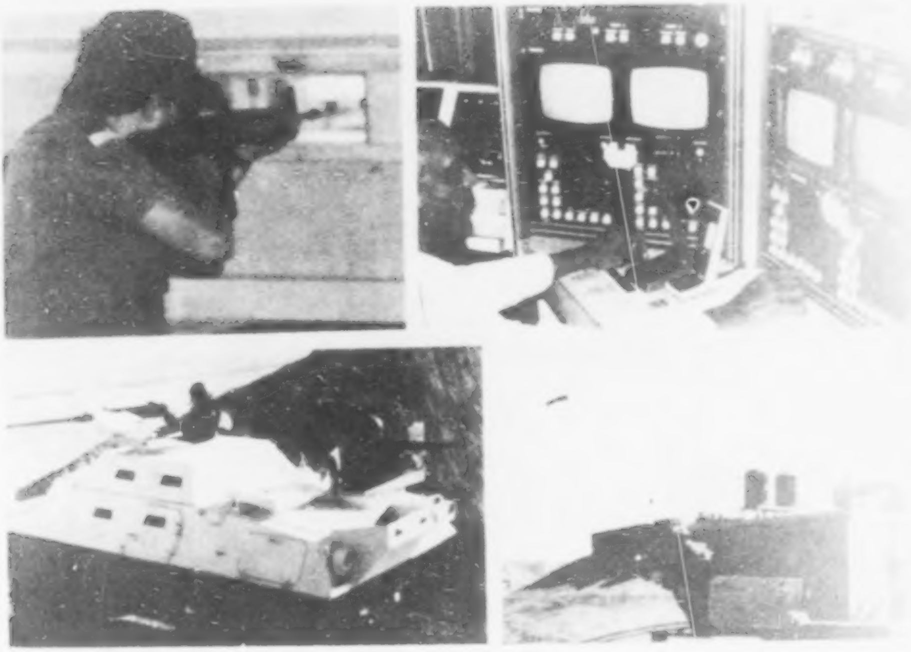
This is Pantex, where we fabricate [deleted] nuclear weapons. This is the fabrication area. The pink area is the PIDAS around the plant. You can see the new towers here. [Deleted.]

Now, very shortly I am going to Pantex.

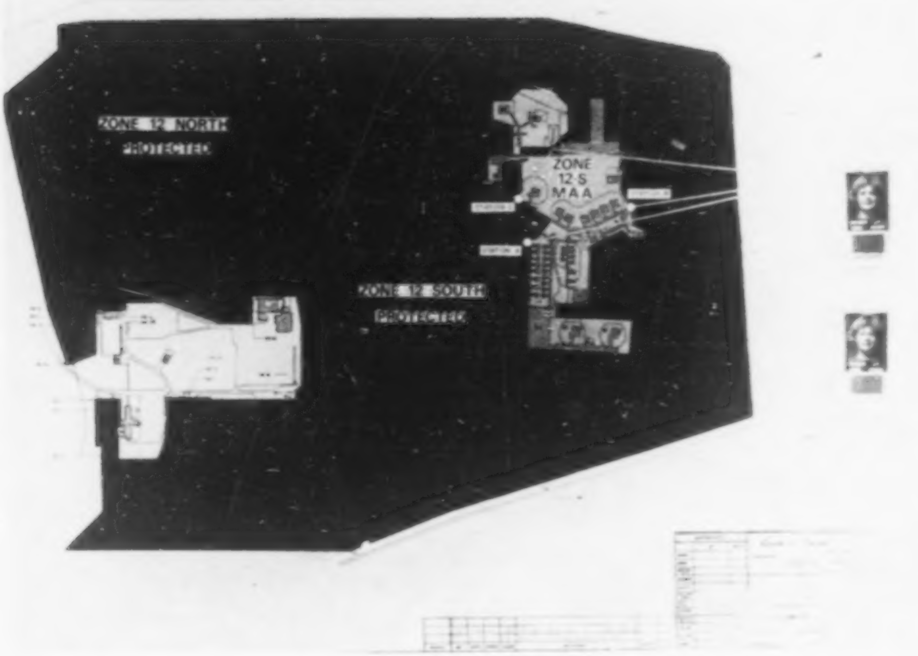
[Deleted.]

I mentioned towers. I didn't show you the worst, but one of the oldest, and, of course, here's one of the new ones we are proud of. [Deleted.] These cost between $80,000 and $84,000 per unit.

COMMAND CONTROL AND COMMUNICATIONS



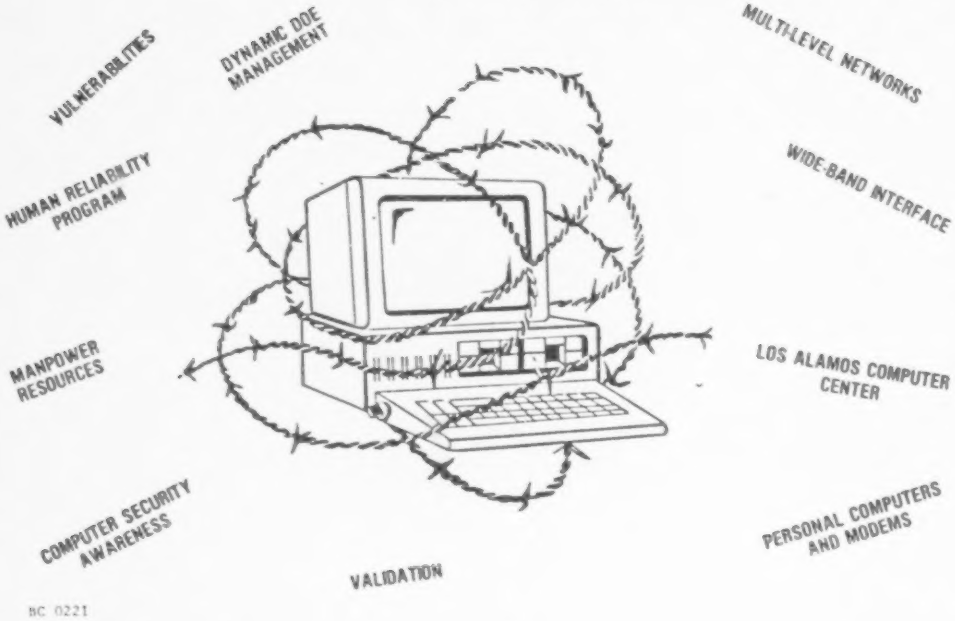
Now something else, a part, Mr. Chairman, of the safeguards and security composite is the Command, Control and Communication system. We are working on that. We have now come up with the new closed circuit television cameras that allow us to see what is happening. We can then communicate the necessary instructions to engage the force if necessary. We need a strong Command, Control and Communication system.


ZONE 12 NORTH
PROTECTED
ZONE 12-S
MAA
ZONE 12 SOUTH
PROTECTED

We are not just resting on our laurels in the hardware area. We are looking at how to do things. We have come up with new systems that preclude people from going on an uncontrolled basis from one place to another, that is, the insider threat. We have to have a commitment, and we have to have a guarantee we can control people.

One of the areas that I will be concentrating on this next year, and you will hear a lot more from me next year on, is computer security.

COMPUTER SECURITY


VULNERABILITIES
DYNAMIC DOE MANAGEMENT
MULTI-LEVEL NETWORKS
HUMAN RELIABILITY PROGRAM
WIDE-BAND INTERFACE
MANPOWER RESOURCES
LOS ALAMOS COMPUTER CENTER
COMPUTER SECURITY AWARENESS
PERSONAL COMPUTERS AND MODEMS
VALIDATION
BC 0221

Our computer security laboratory at Los Alamos is going to assist us in addressing this problem.

Now, why is computer security so important? How many of you think that there are many secrets in the DOE that you cannot get out of the computer? If an individual can have access to our computers, he or she have access to our secrets. We must look at this. We have no choice. And we have already begun. I have already gotten people from Lawrence, Livermore, and Los Alamos to be assigned with me for a year until I can build up my resources and strategy in this area. We are putting $1.9 million into computer security this year.

Now, sir, that concludes the area of the crosscut, if you will. The $712 million authorization requested covers Defense programs and the rest of DOE.

Now I would like to discuss very rapidly the four program areas directly within my office for which I for which I am requesting funds.

SAFEGUARDS AND SECURITY

FUNDING SUMMARY

FY 1985	FY 1986	
APPROPRIATION	AUTHORIZATION	APPROPRIATION
$ 56.2	$ 56.1	$ 56.1

This is the Office of Safeguards and Security. You will notice the funding request at the bottom. Actually, we went down just a little bit. What does this office do? It sponsors research and development for safeguards and security activity. It sponsors the development of prototype equipment and systems. It provides assistance on a site-by-site basis to field office managers insolving their safeguards and security problems.

SECURITY INVESTIGATIONS

9,700 NATIONAL AGENCY CHECKS

WASHINGTON
U.S. DEPARTMENT OF ENERGY
2

20,260 FULL FIELDS

FUNDING SUMMARY
(DOLLARS IN MILLIONS)

FY 1985	FY 1986	
APPROPRIATION	AUTHORIZATION	APPROPRIATION
$34.0	$33.4	$33.4

The next area is security investigations. As you can see, we have scheduled 20,260 full-field investigations next year and almost 10,000 national agency checks. The current average for a full-field investigation conducted by the Office of Personnel Management is 214 days. It is too much.

The Office of Personnel Management is working on this problem. They are obtaining more contractor support. Hopefully the time for such investigations will be reduced to 90 days.

OFFICE OF CLASSIFICATION

DEPARTMENT OF ENERGY
CLASSIFICATION OF INFORMATION MANUAL
SECRET
CG-W-5
JOINT DOE/DOD NUCLEAR WEAPON CLASSIFICATION POLICY GUIDE
SECRET
Understanding Classification

FUNDING SUMMARY
(DOLLARS IN MILLIONS)

FY 1985	FY 1986	
APPROPRIATION	AUTHORIZATION	APPROPRIATION
$ 3.9	$ 3.8	$ 3.8

Next is the Office of Classification with a request for $3.8 million. I have already spoken of that office earlier. I feel strongly about it.

Mr. STRATTON. We have a separate witness for security investigations, have we not?

Mr. COOK. No, Sir.

Mr. HOOVER. No, sir.

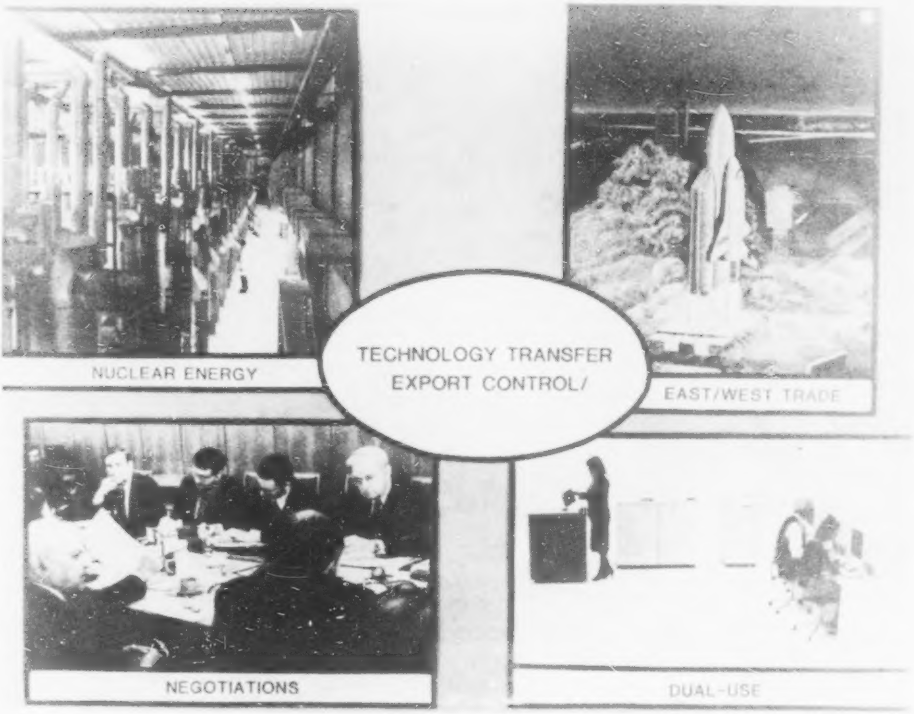
Mr. STRATTON. Mr. Ofte?

Mr. HOOVER. That is environmental, sir.

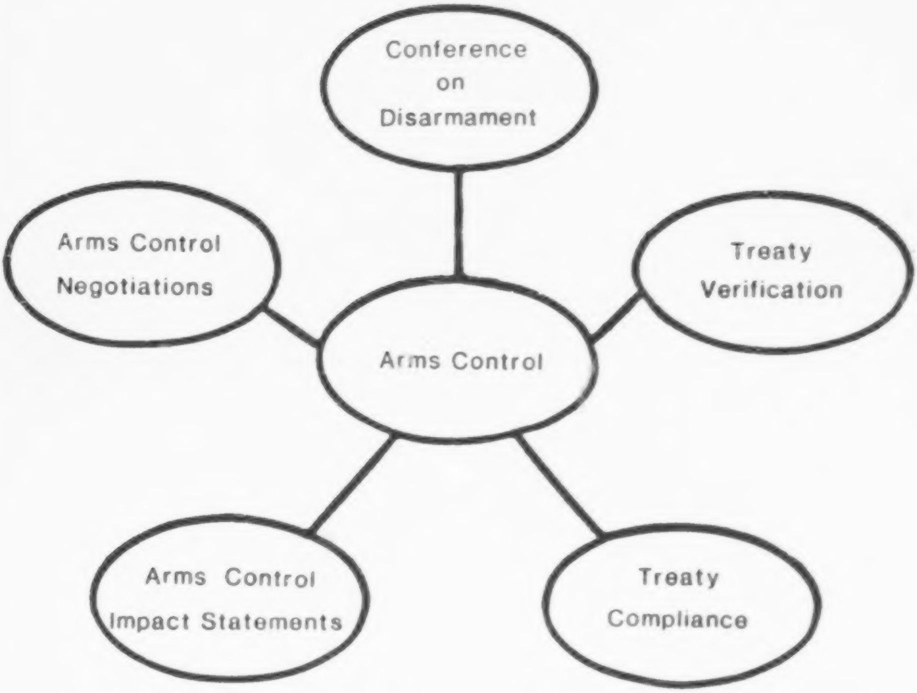
Mr. COOK. Environmental, yes, sir. That was the only viewgraph I had on that.

OFFICE OF
INTERNATIONAL
SECURITY AFFAIRS

In the international security affairs area, our mission is to help verify arms control treaties and to control our exports.


NUCLEAR ENERGY
TECHNOLOGY TRANSFER
EXPORT CONTROL/
EAST/WEST TRADE
NEGOTIATIONS
DUAL-USE

We do not want our secrets to get out of the country both in the peacetime mode and, of course, in the nuclear security information type mode.

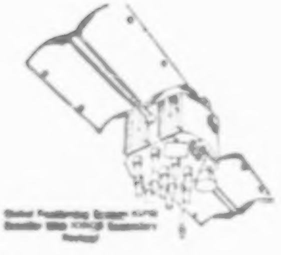

Conference on Disarmament
Arms Control Negotiations
Treaty Verification
Arms Control
Arms Control Impact Statements
Treaty Compliance

In the arms control business we look at treaty compliance and treaty verification. We have an R&D program in which we spend about $76 million putting sensors on satellites and so forth. [Deleted.] It is this work that allows decisions about where we should go technology wise and what we should demand out of a treaty.

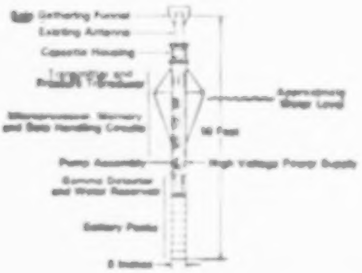
So the technical input to negotiators for a treaty is extremely important.

In many export control cases, we have dual-use type technology that we have to be particularly careful in evaluating.

VERIFICATION CONTROL AND TECHNOLOGY



Sampling Buoy


Gathering Funnel
Existing Antenna
Cassette Housing
Microprocessor, Memory and Data Handling Circuits
10 Feet
Pump Assembly
High Voltage Power Supply
Gamma Detector and Water Reservoir
Battery Packs
8 Inches

Regional Seismic Test Network

FUNDING SUMMARY
(DOLLARS IN MILLIONS)

FY 1985	FY 1986	
AUTHORIZATION	AUTHORIZATION	APPROPRIATION
$76.7	$93.6	$93.6

A part of what we look at is the fuel cycle itself. And, of course, recently with South Africa, we had to address the problem of United States citizens working over there, which is not a proliferation concern. It is strictly a compliance concern. But in any case, these people have to have the authorization of the Secretary before they can perform such functions.

URANIUM TAILS STOCKPILE
PLUTONIUM
REPROCESSING
FUEL STORAGE

[Deleted.]

Without our commitment in this area, we couldn't do this.

[Deleted.]

We are involved with the global positioning system, satellite. We support this system by providing sensors to collect data. We also have sampling buoys in the ocean. This is the only area where we see an increase in authorization, particularly $16 million. This increase is needed to keep up with the schedule and future R&D to make sure we have the wherewithal and capability of checking the other side, making sure they are not getting away with something.

Sir, very rapidly, too rapidly, that is my presentation of the status of our programs. I would entertain any questions you have at this point.

Mr. STRATTON. What is the add on for the budget as a result of all of the changes you have made?

Mr. COOK. The add on for the entire budget is roughly $16 million. Three program areas in Security Affairs went down or stayed about the same. One problem area, the Office of Internal Security Affairs, seeks an increase.

VOICE. Safeguards and security add on?

Mr. COOK. Yes.

VOICE. The whole thing.

Mr. COOK. $675 million to $712 million authorization. Sir, in the overall, what I gave you was the security affairs, the core package. The entire crosscut authorization went up from $675 million to $712 million. That is a $37 million increase.

Mr. STRATTON. $675 million to what?

Mr. Cook. $712 million in authorization.

Mr. Stratton. $712 million?

Mr. Cook. Yes, sir; a $37-million increase.

Dr. Mansfield. Those funds show up all over DOE, not just programs under your office?

Mr. Cook. That is right, all over DOE.

Mr. Stratton. OK. Any questions? Yes.

Dr. Mansfield. One short question. If the security at Los Alamos has been improved to this extent, why do we need to remove the device assembly activities from Los Alamos and consolidate them at great expense at NTS?

Mr. Cook. That was one facility which was in fact closed down. It has not been replaced. It would have to be replaced. But operationally it has been, I think, a good decision to combine the two in Nevada within the DAF, as we call it, Device Assembly Facility.

Mr. Stratton. Any other questions?

Thank you very much, Mr. Cook.

Mr. Cook. Thank you, sir.

Mrs. Holt. Mr. Chairman, let me just say it looks as if we have made tremendous improvement. I want to commend the gentlemen. I think it was a good briefing, and we have come a long way in the last few years.

Mr. Cook. Thank you very much.

Prepared Statement of Billy G. Cook

Mr. Chairman and members of the Committee, I am Billy G. Cook, Deputy Assistant Secretary for Security Affairs. It is a pleasure to appear before you today to address the Department of Energy's Security Affairs programs of Nuclear Safeguards and Security (including Classification), Security Investigations, and Verification and Control Technology and our FY 1986 budget request required to carry out these important programs.

This is my first opportunity to testify before this committee. Before proceeding with the discussion of the budget request, permit me to introduce myself to you in a little detail. I was appointed Deputy Assistant Secretary for Security Affairs on January 8, 1985. Prior to assuming this position, I served for more than 27 years in the United States Army, retiring on October 31, 1984, as a Colonel. My military career was primarily in the nuclear and chemical areas. During the last few years I have been extensively involved in nuclear security and survivability issues and the management of a complex program for upgrading the security of the United States nuclear weapons sites in the North Atlantic Treaty Organization (NATO). Subsequently, as the Special Assistant for Nuclear Security and Survivability in the Office of the Secretary of Defense, I was responsible for developing and overseeing these areas both within and outside the continental United States. These duties required extensive interface and management with all major agencies and NATO. These experiences have, I believe, prepared me well for my current assignment. I have attached my biography to this statement.

Mr. Chairman, it is my intention to keep you fully and currently informed on all activities of interest to your Committee in the Security Affairs area. Routinely, I will be communicating our program initiatives and areas of concern to you. If you or your Committee seek additional information on our programs, I would be pleased to meet with you.

SECURITY AFFAIRS

The programs under my purview in Security Affairs that I would like to discuss with you today play an extremely critical role in fulfilling the Department's national security mission, and we are keenly aware of the importance of our responsibilities in carrying out these activities. These programs are the Department's cornerstone in: preventing the theft or sabotage of nuclear weapons, materials, facilities, and classified information; developing and implementing policy for managing the classification and declassification of information; providing nuclear weapons systems expertise to the Intelligence Community; controlling proposed exports of nuclear materials and equipment; providing technology and equipment necessary to monitor treaty compliance of foreign nuclear weapons programs; and providing technical and analytical support for DOE's role in arms control negotiations, policy formulation, and implementation.

Here with me today are Mr. Robert A. O'Brien, Director, Office of Safeguards and Security; Dr. Julio L. Torres, Director, Office of International Security Affairs; and Mrs. Jill E. Lytle, Director, Office of Classification. All three individuals would be pleased to answer any questions you or the members of the Committee might have. Also here with us today is Mr. Charles Boykin, the Deputy Assistant Secretary for Intelligence. Funding for the intelligence activities, which are organizationally assigned to Mr. Boykin, is included within the Verification and Control Technology request and, accordingly, I will cover intelligence matters in my presentation today. Mr. Boykin will be happy to answer any questions you may have regarding DOE intelligence activities.

With the Chairman's permission, I will submit my formal statement for the record. I would then like to make a presentation which covers the Security Affairs program activities, highlights some of our recent accomplishments, particularly in the safeguards and security area, and discusses the funding requested in the President's Fiscal Year 1986 budget. You each have copies of my formal statement and the viewgraphs I will use today.

FISCAL YEAR 1986 BUDGET

The overall funding requirement in Fiscal Year 1986 for Security Affairs' programs is $186.9 million. This consists of $59.9 million for Nuclear Safeguards and Security (including $3.8 million for Classification), $33.4 million for Security Investigations, and $93.6 million for Verification and Control Technology. I will now briefly discuss each of the Security Affairs programs.

NUCLEAR SAFEGUARDS AND SECURITY

The Nuclear Safeguards and Security program has three major program goals. These are:

To prevent the theft, sabotage, or loss of nuclear materials, facilities, and unauthorized disclosure of classified information;

To provide a base of safeguards and security technology and information which can be used to protect Department of Energy facilities, and to control and account for nuclear weapons, materials, and classified information; and

To strengthen international safeguards and physical security to deter the diversion of nuclear materials and support nonproliferation and national security objectives.

In the short time since I have been associated with the Department of Energy, I have visited most of the DOE facilities of major security concern. I have toured our most critical sites and reviewed the vulnerabilities that currently exist and the upgrades and actions that have been taken or are underway to mitigate these vulnerabilities. Also, I have seen our special response teams in tactical training exercises. The confidence of the people I have talked with, and the improvements already made, underway, and planned, convince me that the Department has turned the corner in improving the posture of our safeguards and security program. However, vulnerabilities still remain which will not be mitigated until some long-term construction projects are completed and a unique site-by-site safeguards and security management program is accomplished. This is now underway and will result in better overall security, awareness, and commitment than previously experienced. Of particular significance is the potential for greatly improving cost effectiveness concurrently with security.

During my visits to our critical facilities, it was quite clear that greater emphasis needs to be directed to materials control and accountability of special nuclear materials (SNM). I am committed to ensuring that all critical SNM process flows are reviewed with the objective of implementing and monitoring state-of-the-art measurements, techniques, and procedures for nuclear material accountability. Also, I am vigorously pursuing the concept of error of propagation statistical methods at our facilities that process SNM in order to ensure we have high confidence associated with site Inventory Differences (ID's). With respect to ID's, we are conducting research and development in the areas of process flow holdup and instruments that are designed to characterize hard-to-measure materials such as uranium in dissolver solutions and gas phases. Other research and development is directed toward concepts for integrating and automating systems of measurement instrumentation to enhance overall performance and cost-effectiveness of the total system.

Additionally, I am keenly aware that the advent of the personal computer explosion requires us to revisit our requirements and potential vulnerabilities at our facilities that process classified information on computers. As a result of my meetings with computer specialists at the facilities I have recently visited, it is my strong opinion that greater awareness, additional resources in the DOE sector, more stringent processing requirements, and system vulnerability assessments are required in the computer security area. I have instructed our Computer Security Center of Excellence, Los Alamos National Laboratory, to closely examine this concern and identify research and development requirements in this most important area. I am significantly expanding the size of the computer security effort in Security Affairs. This is one of the key programs which I will be developing and monitoring very closely this year.

Our improved Safeguards and Security posture is due in large measure to DOE's top management personally supporting and making this program one of its main priorities over the last few years. This same support has also been exhibited by this Committee and the Office of Management and Budget. Mr. Chairman, as we are still in the enhancement mode, in that there is still much to be done, we again require your support to enable the Department to further improve and integrate a comprehensive safeguards and security program.

INITIATIVES

Before discussing in detail the specific program areas for which funding is requested, I would like to call your attention to a number of initiatives which we have undertaken to enhance our overall operations.

The Federal Aviation Administration (FAA), as requested by DOE, has completed a series of public hearings on airspace restrictions over nine critical DOE facilities. We anticipate that the FAA will issue a proposed rulemaking on the restrictions for several sites about mid calendar year 1985, with the remaining sites to follow as specific implementation problems are resolved.

A DOE Central Training Academy has been established at Kirtland AFB, New Mexico, and is beginning operations. Its purpose is to effect a uniform approach to training in tactical, legal, operational, and technical aspects of physical security.

Public hearings were held and a final rule was published on physical fitness and medical standards for DOE protective force personnel. The standards became effective in December 1984.

A proposed rule was developed and public hearings held on arrest authority and use of deadly force by DOE protective force personnel. A final rule is anticipated in 1985.

DOE protected areas have been upgraded by providing improved perimeter barriers and lighting; new or improved patrol stations and towers; new or improved security operations support facilities; installation of key card access control systems; computer controlled alarm and closed-circuit television (CCTV) surveillance systems; electronic personnel search equipment for special nuclear material (SNM) storage and use areas.

Material control and accountability activities are being upgraded through improved material assay and other measuring systems. Technology advancements have been made in security and safeguards components and systems for application to nuclear weapons and fuel cycle facility upgrade projects, including new facilities. Advancements include CCTV assessment systems; an automated plutonium vault inventory system; a central alarm and assessment system designed for a large nuclear fuel cycle complex; SNM portal monitors; an enhanced "two person" role in SNM storage areas; a nondestructive assay system for spent naval fuel; and related measurement assurances that material will not be diverted for unauthorized purposes.

Rotor-wing response aircraft were obtained at Idaho, Nevada, and Savannah River.

We have developed and distributed to the International Atomic Energy Agency (IAEA) inspectors substantially improved and efficient safeguards instrumentation and equipment which will enhance the safeguards mission of the IAEA.

The Operations Security (OPSEC) Program was revitalized, and a DOE Center for Operational Security was established at the Los Alamos National Laboratory. This program is aimed at assisting the field in better understanding the hostile intelligence threat to facilities involved in nuclear weapons and fuel cycle program activities and promoting modifications to counter that threat.

In conjunction with other organizations within the Department, we established and managed a program called "Tempest"—which was designed to improve DOE capabilities for protecting classified computer operations from issuing compromising electro-magnetic emanations.

Efforts continue to provide timely intelligence to field elements on current events including notifying the field more quickly about threats to other governmental operations so that our security forces are prepared for action.

We have recently established a program that will examine the consequences of sabotage directed against major components of the electric utility systems which supply power to DOE weapons and production facilities, the Strategic Petroleum Reserve, and other agencies that rely on electric energy during crisis situations.

We completed a major modernization of weapon classification policy and issued a revised comprehensive joint DOE/DOD nuclear weapon classification guide.

We also continued development of an automated data base for classification guidance, precedent documents, and open literature references to classified subject areas. This is an area that continues to become more significant as new technology emerges. Moreover, as interaction with other governments increases, the need for a modernized, streamlined, and responsive classification program is imperative.

THE BUDGET

The Nuclear Safeguards and Security budget request for Fiscal Year 1986 is $59.9 million, about the same as for last year. Operating expenses require $54.3 million, capital equipment $4.6 million, and construction $1.0 million.

The safeguards and security program strategy requires that our Fiscal Year 1986 authorization request directly support operational, developmental and construction activities. Operational activities include: technical assistance, in terms of system interface, upgrades, and improvements required to address vulnerabilities identified by onsite evaluations; protective force training; nuclear materials management, control, and accounting; and the management oversight of the New Brunswick Laboratory. Developmental activities, which include research and development of physical protection systems, hardware, and technology to strengthen the overall safeguards and security program, are conducted by the national laboratories for application by the Department's field operations. Construction activities include the construction of a Nuclear Safeguards Technology Laboratory at Los Alamos, which is badly needed to improve material control and accountability.

The safeguards and security authorization request does not provide funding for the construction, capital equipment, and operating expenses of Department-wide safeguards and security systems at our field facilities. These costs are budgeted for and expended by the Department's outlay programs, which include the nuclear weapons, nuclear materials production, and the civilian nuclear energy and energy research programs.

In view of the potential consequences of a malevolent act at one of our sites, protecting our Nation's nuclear weapons, nuclear materials, and sensitive and unique facilities is a tremendous responsibility that challenges the capabilities of the foremost experts and management. We rely on a cadre of Federal, contractor, and national laboratory representatives to meet this challenge. Due to the changing nature of the threat to DOE facilities, new, more sophisticated protection programs continually need to be developed to effectively safeguard our resources.

Mr. Chairman, the Fiscal Year 1986 authorization request of $59.9 million consists of the following six basic elements which I will address in greater detail. These include: safeguards and security operation, technology development, international safeguards, classification, construction, and program direction.

SAFEGUARDS AND SECURITY OPERATIONS

Activities included under the safeguards and security operations category provide direct support to the overall mission of protecting all sensitive Departmental resources, which range from completed nuclear weapons to classified documents. At the heart of this program is the continued need to establish a systematic approach to the safeguards and security problem which treats the dilemma as a whole rather than a partitioned problem.

Elements in this category involve three major functions: guidance and direct assistance to Departmental field operations for safeguards and security system improvements; oversight and operation of the nuclear materials management and safeguards system, which provides timely data on nuclear materials production, utilization, transfer, tracking, and storage; and the operation of the New Brunswick Laboratory, the safeguards analytical laboratory at Argonne, Illinois.

One of our highest priority efforts is to continue providing expert technical assistance to Departmental field operations managers to support the application of the most advanced safeguards and security technology and hardware to fit site-specific needs. Areas for improvement are identified through onsite inspections, vulnerability assessments, and field office requests. Site-specific assistance for identified improvements is planned for a number of key defense-related facilities. This effort is bearing significant dividends through the realization of noteworthy specific safeguards and security improvements at weapons and nuclear material production program facilities as mentioned previously.

In Fiscal Year 1986, major efforts will continue to be expended to ensure the application of technology that has been developed in the Nuclear Safeguards and Security program to upgrade protective activities and to correct vulnerabilities throughout the complex. Based on comprehensive vulnerability analyses at select DOE sites, we will be implementing systems incorporating technological advances in access denial, delays, intrusion detection, surveillance, integrated security communications, and materials control and accounting. Personnel and material control and accountability systems will be installed at key DOE facilities to counter potential sabotage and diversion of materials by insiders.

Through guidance and technology, we will continue to expand our capability to neutralize attempts to interfere with the Department's communications or to penetrate information processing systems and to improve computer security. As previously mentioned, we intend to step up research and development and to increase the manpower dedicated to computer security functions. Activities will include an increased assessment of field operations to determine the existence of vulnerabilities to hostile intelligence efforts, more rapid development of advanced audio surveillance and suppression methods, and the continuation of developmental activities and training at an enhanced level for improved security of classified computer operations.

Technologically advanced special weapons and tactics training, with a particular focus on realistic combat situations, has become a critical ingredient in improving the capabilities of our protective forces at each of our facilities. We will utilize our Central Training Academy to assure the highest standard of readiness through DOE and to effect a uniform and professional approach to protective force training in tactical, legal, operational, and technical aspects of physical security.

A major effort will be undertaken to implement a human reliability program in Fiscal Year 1986. This program, which centers upon the insider threat by constantly monitoring the reliability of DOE and contractor employees, should be fully developed and partially implemented in Fiscal Year 1985.

[Deleted.]

We will continue to operate the DOE's Nuclear Materials Management and Safeguards System, supported jointly with the Nuclear Regulatory Commission (NRC). It is the Nation's single nuclear materials computerized data base for tracking the location of nuclear materials in the United States and for recording the shipment of nuclear materials to and from foreign countries. Each year, approximately 78,000 nuclear material transactions (e.g., shipments, receipts, inventory changes) from 93 contractors and 1,400 licensees are entered into this system. The Department's nuclear materials tracked by this system are worth approximately $10 billion.

We also continue to directly support and to utilize the New Brunswick Laboratory, which serves as the United States Government's safeguards analytical laboratory and provides reference materials and services to DOE and the NRC on a cost-reimbursable basis. The laboratory's measurements, reference material standards, and inventory verification services fulfill safeguards requirements essential for the control and accounting of nuclear materials.

TECHNOLOGY DEVELOPMENT

Technological development continues to be an integral part of our safeguards and security program since advanced technology is necessary for improved protection systems for DOE nuclear facilities. Research and development conducted by the national laboratories provides us with a technological base to be used in safeguarding the Department's nuclear facilities and materials and to assist the NRC and its licensees. Efforts are directed toward the development and testing of new technology, components, and systems for entry control, intrusion detection, explosives detection, use-denial, and detection-surveillance assessment for airborne intrusion to increase our effectiveness against a wide spectrum of threats.

As I previously mentioned, one of my major areas of concern is material control and accountability. Improvements in controlling and accounting for nuclear material have been realized this past year but even greater enhancements are being sought. These will include projects to measure specific nuclear materials that are inherently difficult to measure, such as those that are inside processing equipment and are, therefore, inaccessible for measurement by conventional methods. Techniques and systems that can be used nondestructively and remotely, thus contributing to safe operations and providing efficient measurements such as for highly irradiated reprocessing dissolver solutions and enriched uranium in process gas, will continue to be investigated. Emphasis will be given to technology to track and confirm the presence of nuclear materials at key locations within a facility. We are emphatically pursuing systems engineering development to integrate measurement processing and other subsystems into an effective material control system capable of improving our detection capabilities against insider threats. These systems will become an integral part of the master security system.

Our present research and development activities are closely coordinated with ongoing developmental efforts of the Nuclear Regulatory Commission and Department of Defense to avoid duplication and to ensure exchange of information and technology. We regularly explore the feasibility of joint research efforts that would be of mutual benefit in order to reduce the cost of such activities to each agency and the United States Government. We intend to broaden the coordination of research and development with the Department of Defense and other appropriate agencies in the near future to further minimize costs and eliminate duplication. I am very proud that our physical protection technology data base is the focal point from which numerous United States' agencies have incorporated our proven research and development innovations into their site-specific requirements which resulted in saving millions of taxpayers' dollars.

INTERNATIONAL SAFEGUARDS

Our international safeguards program supports U.S. nonproliferation and national security objectives of minimizing the proliferation of nuclear weapons. Its principal objective is the strengthening of international safeguards effectiveness through technical support to the International Atomic Energy Agency (IAEA) and cooperative efforts with other nations. Activities will include: continued development of procedures and instrumentation for safeguarding spent fuel reprocessing facilities; development of advanced containment and surveillance systems utilizing closed circuit television and an advanced fiber optic security seal which can be verified in the field, thus alleviating the need to transmit the seal to Vienna (IAEA Headquarters) for verification; continued development of safeguards for application at the new Gas Centrifuge Enrichment Plant (GCEP) at Portsmouth, Ohio, which is currently under IAEA Safeguards inspection; development and testing of instrumentation for nondestructive assay (NDA) of nuclear materials at nuclear facilities; and training of foreign personnel to perform safeguards and security functions in their own country in accordance with Section 202 of the Nuclear Non-Proliferation Act of 1978.

A major emphasis of the program is an aggressive effort for bilateral cooperation with other nations to improve safeguards. As an example, recent discussions and demonstrations of nondestructive assay equipment in Brazil are encouraging and illustrative of our commitment to assist other nations in the development and implementation of safeguards systems. In addition, the Department will continue its cooperative research, development, and testing of safeguards equipment and techniques with the safeguards laboratories and inspectorates of the European Community (Euratom) and the IAEA. In order to maximize research dollars, we routinely transfer domestic research and development technology that may have application to our international safeguards program.

Compliance with international agreements and nonproliferation objectives requires tracking international shipments of United States materials and shipments of foreign materials in the United States. Continuing activities include recording exports, imports, and transfers of materials of foreign origin in the United States; reporting to the International Atomic Energy Agency under the United States/International Atomic Energy Agency Agreement; and determining inventories of nuclear materials for bilateral agreements.

CLASSIFICATION

The Fiscal Year 1986 authorization request for the Classification program, which is incorporated in the Nuclear Safeguards and Security program budget, is $3.8 million. The Office of Classification is responsible for implementing and managing the Department's classification and declassification program.

In keeping with its responsibility to maintain credible and up-to-date classification policies and guidance, the Office of Classification has continued to seek support in the form of technical studies and analyses. Areas under consideration during the past year have included Nuclear Directed Energy Weapons (NDEW), vulnerability information, and radioactive material dispersion. In addition, a program was developed for the review of sensitive nonnuclear technologies, and a major consolidation of all safeguards and security classification guidance was completed.

The Fiscal Year 1986 request will initiate the development of a system for tracking open literature references to classified subject areas and additional technical analyses in support of classification guidance development. Fiscal Year 1986 classification policy activities will concentrate on such areas as directed energy weapons, computer codes, inertial confinement fusion, and advanced isotope separation. Work will include a major revision to the classification education and appraisal functions. The development of an automated information retrieval system for all classification guides and precedent-setting documents will be completed.

CONSTRUCTION

A New Nuclear Safeguards Technology Laboratory (NSTL) to be located at Los Alamos will be constructed to improve our research and development effort in safeguards and security technology area. The purpose of this project is to provide for centralized instrumentation development laboratories specifically designed for safeguards requirements; urgently needed space for the development, testing, and evaluation of measurement and accountability systems for implementation in DOE nuclear facilities; and facilities to support rapid transfer of advanced safeguards technology to the nuclear community.

An additional benefit of the NSTL will be improved security of special nuclear materials. At present, the safeguards research and development facilities are not in a security area. Because of this, nuclear materials must be transported from a different site, guarded by armed personnel while in use, and returned to the original site at the end of each day. The NSTL will be a materials access area within a protected area. Thus, during required periods, the daily transportation of SNM over public access roads between an offsite vault and the safeguards laboratories will be virtually reduced to zero.

The total estimated cost of this facility is $10.6 million, with $1.0 million requested in Fiscal Year 1986 for building design and construction of an access road.

PROGRAM DIRECTION

Our program direction supports a total of 137 full-time equivalent positions, which includes the staff for the classification program.

SECURITY INVESTIGATIONS

The Fiscal Year 1986 authorization request for personnel security investigations is $33.4 million. Background investigations are required by the Atomic Energy Act of 1954, as amended, and by Executive Orders 10450 and 10865. The Department is not permitted to conduct its own investigations; hence, we rely on and reimburse the Federal Bureau of Investigation (FBI) and the Office of Personnel Management (OPM) for conducting investigations on Department of Energy employees assigned to critical sensitive positions, contractor employees, and consultants prior to their being granted access to classified information, classified materials, or special nuclear materials.

In order to have efficient program management and be consistent in meeting security requirements, we use this single program to meet the strict requirements of the Atomic Energy Act of 1954 to ensure that granting access to classified information, classified material, or special nuclear material will not endanger the common defense and security. Most background investigations directly support Defense Programs activities; however, all security investigations are funded under Defense Programs since the Department believes any clearance or access determination is directly related to protecting the common defense and security.

A current problem in this area is the length of time it takes to conduct a background investigation. The time period for OPM investigations has approximately doubled over the last few years and now takes about 200 days. We have been informed by OPM that they have taken the necessary actions, including the hiring of contractor investigators, to remedy this problem. We should see some relief in our backlog by mid calendar year 1985.

We continually improve the effectiveness of our clearance program by such means as requiring DOE contractors to perform more stringent preemployment checks.

The projected cost for a single FBI background investigation is $1,850, and the projected cost for an OPM background investigation is $1,625. National Agency Checks are expected to continue to cost approximately $10 each. Our budget request provides for approximately 29,960 full-field investigatins and National Agency Checks, which is a net decrease from the current fiscal year of approximately 1,170 investigations.

SAFEGUARDS AND SECURITY CROSSCUT

To this point, I have been discussing the funding request for Security Affairs' programs. The DOE outlay programs provide the funding for the actual construction, capital equipment, and operating expenses for safeguards and security activities relating to their programs at the Department's field facilities. Total safeguards and security funding is collectively reflected in the Department's safeguards and security crosscut estimate, which is an administrative summation of all safeguards and security items in the Department's program requests, including the request for the Office of Safeguards and Security (OSS), with the exception of the Office of Classification component. The crosscut estimate for Fiscal Year 1986 totals $712 million.

We continue to have a range of responsibilities with respect to safeguards and security crosscutting activities. We continue to ensure that safeguards and security related budget submissions of all DOE organizations properly reflect judgments that have been made with respect to facility responsibilities. In addition, OSS has been identified as the Departmental focal point for all DOE safeguards and security activities. One aspect of the OSS focal point role is the consideration to assign to OSS the functional responsibility for budgeting, justifying, and validating all Defense Programs safeguards and security line-item construction projects. This matter is still under discussion within DOE, and I will inform you of the final decision.

VERIFICATION AND CONTROL TECHNOLOGY

I would now like to discuss the Fiscal Year 1986 budget request for the Verification and Control Technology program. This program has four specific goals:

To develop and produce the technology to monitor foreign nuclear explosions conducted underground, in the atmosphere and in space, and to monitor compliance with nuclear weapons-related treaties.

To control proposed exports of nuclear and energy-related materials, equipment and technology to ensure such exports are consistent with U.S. national security and with nonproliferation policy.

To provide technical and analytical support for DOE's role in nuclear arms control negotiations, policy formulation, and implementation.

To meet DOE intelligence requirements and to provide DOE's unique weapons and nuclear-related expertise to the Director of Central Intelligence (DCI) and the Intelligence Community.

As I mentioned earlier, the funding for DOE intelligence activities is included in the Verification and Control Technology line item of the Defense Programs budget, and I will cover those activities. Deputy Assistant Secretary Boykin is available to respond to your specific questions.

INITIATIVES

Before discussing in detail the specific program areas for which funding is requested, I would like to call your attention to a number of initiatives that the Verification and Control Technology program has carried out recently.

Four satellites carrying Department of Energy (DOE) instrumentation for monitoring treaty compliance of nuclear detonations in the atmosphere and in space were launched in 1984.

[Deleted] satellite payload systems for detecting, locating, and determining yield of nuclear detonations in the atmosphere and in space were completed for future deployment.

To reduce funding outlays, molded plastic parts have been developed, and replaced machined metal parts to save 80 percent in cost and 40 percent in weight in DOE's satellite instrumentation systems.

In response to the President's call for negotiations leading to direct yield measurements by the United States and the Soviet Union at each other's test sites in order to improve verification of compliance with the Threshold Test Ban Treaty (TTBT), an expanded program of research on direct yield measurements under expected

TTBT conditions has been initiated at the Los Alamos and the Lawrence Livermore National Laboratories.

A major review of teleseismic data gathered over the last decade pertaining to questions of Soviet compliance with the Threshold Test Ban Treaty was completed. As a result, more meaningful technical conclusions can be presented to policy and decisionmakers.

The Norwegian Regional Seismic Array (NRSA), which will be used for the detection and identification of underground explosions, was installed in Norway and began operation at the end of September. Like the Regional Seismic Test Network in North America, the NRSA transmits data in real time via satellite to analysis centers in the United States.

The Regional Seismic Test Network (RSTN), a five-station network located in the United States and Canada, has completed two years of highly successful operation. This network serves as a prototype for a regional monitoring network in the Soviet Union for a possible future comprehensive test ban treaty.

In 1983, Defense Programs evaluated over 5,000 nuclear export applications. The nuclear export application workload expanded by 40 percent in 1984 to about 7,000 cases but, through improved management procedures, including automated data bases and laboratory support, the workload has been met.

The U.S./U.K. Mutual Defense Agreement, which provides for the exchange and transfer of nuclear weapons information and materials, was extended through 1994.

THE BUDGET

Turning now specifically to the Verification and Control Technology budget, our request for Fiscal Year 1986 is $93.6 million which includes $83.5 million for operating expenses, $5.6 million for capital equipment, and $4.5 million for construction. The operating expense figure includes $3.8 million for program direction. Activities supported by operating expenses fall into two functional categories: detection technology and analytical support, both of which draw upon the unique expertise, skills, and resources of the national laboratories of the nuclear weapons complex.

The Fiscal Year 1986 increase of $9.3 million in operating expenses (exclusive of program direction) over Fiscal Year 1985 is attributable mainly to increased satellite sensor deliveries which DOE must make for various satellite systems and for our base technology program.

[Deleted.]

Beyond the increase in operating expenses, the Fiscal Year 1986 request also allocates $4.5 million to continue construction of a Space Science Laboratory supporting satellite fabrication and technology development efforts at Los Alamos. Total estimated cost is $7.5 million, with completion in late 1987.

DETECTION TECHNOLOGY

Detection technology encompasses technologies related to the detection of nuclear weapons activities—spaceborne sensors, seismic and nonseismic techniques, debris detection, sample analysis, and other scientific efforts. Our activities are designed to respond to treaty verification [deleted].

The Fiscal Year 1986 budget request for detection technology activities is $58.6 million, a $7.6 million increase over the Fiscal Year 1985 level of $51.0 million. The increase is to meet requirements for acceleration of the spaceborne sensor delivery schedule, to increase the current level of effort in Directed Energy Verification, and in the investigation of advanced sensor concepts.

SPACEBORNE SENSORS

The overall purpose of our space effort is to develop and maintain United States capability to detect, locate, [deleted] nuclear explosions from spaceborne platforms [deleted]. The effort includes research and development, the actual fabrication of sensor packages, and operational support, which provides for calibration and testing of subsystems and evaluation and analysis of data collection, processing and exploitation. [Deleted] Additional funds are required in Fiscal Year 1986, however, to procure long leadtime items for Fiscal Year 1987–88 production. The main carriers of DOE-made sensors are the Global Positioning System (GPS—which provides a navigational capability for the military) [deleted]. All DOE sensors ride the satellites on a secondary mission basis. When the GPS system is fully deployed in the late 1980's, our sensors on board will be able to locate atmospheric nuclear explosions [deleted].

In conjunction with the Air Force, we provide operational support for the DOE sensors. We maintain the readiness of sensors delivered to the spacecraft manufacturers, [deleted].

Underpinning the production and operational support elements of the detection technology effort is a base technology effort to conduct research to define future instrument needs, advance the underlying science and technology, and develop new instrument system concepts and configurations. This effort addresses the earth and space background in which the instrument systems must both survive and function, the nuclear weapons effects environments in which the instrument systems must survive, the special reliability requirements inherent in secondary mission payload status, and the additional requirement that systems launched by shuttle must be man-space-qualified.

DIRECTED ENERGY VERIFICATION

Due to the increased U.S. and Soviet activity in directed energy technologies, we have begun the development of a technology base for treaty verification monitoring support. Instruments are required immediately to remotely detect, identify, and characterize directed energy experiments and devices. The program will exploit DOE directed energy programs, such as accelerators, to provide emission sources and, by combining the unique expertise available within DOE on both directed energy and emission detectors, will avoid costly duplication of facilities or staff. This program will emphasize the definition of an adequate near-term capability using existing sensors and platforms where possible, while conducting research and engineering development on systems which will provide enhanced capabilities in the future.

TECHNOLOGY DEVELOPMENT

Efforts will continue toward development of new technologies to enhance current measurement capabilities or to provide entirely new techniques of measurement to support our verification and detection effort. Such efforts require highly specialized research, capitalize on unique DOE laboratory expertise and capability, and assist DOE in maintaining its leadership role in verification and monitoring technology. Advanced concepts currently include x-ray imaging, fiber-optic seismometers, and fiber-optic detectors.

The latter concept, while early in its development cycle, may have a major impact on verification detection technology.

DEBRIS DETECTION AND SAMPLE ANALYSIS

United States nuclear test detection capabilities are currently focused on the Northern Hemisphere. [Deleted.] In the near term, other sensor systems to monitor remotely the nuclear debris could assist in the Southern Hemisphere coverage as well as provide corroborating data sources. The Department has successfully demonstrated the capability of remotely sampling the atmosphere for nuclear debris using free-floating, buoy-type marine platforms. This technology is being adapted for remote land application. A network of surface air sampling stations is in place around the world to aid in detecting nuclear weapon tests in the atmosphere.

[Deleted.]

DOE also is studying ocean area background radiation and the mechanisms of debris transport to provide data for development of sensor deployment strategies. The technical analyses being performed in this program will contribute significantly to a basic understanding of Southern Hemisphere ambient levels, radionuclide deposition patterns and air mass movements.

[Deleted.]

SEISMIC

DOE's in-country seismic program was established to support research and development for developing enhanced seismic verification capability at regional (short range) and local distances and to ensure that DOE can provide in-country seismic equipment/systems to support United States verification of future nuclear test ban treaties. The operation and maintenance of DOE's Regional Seismic Test Network (RSTN) will continue to be conducted at the Fiscal Year 1985 level. This five-station network, located in the United States and Canada, is a research tool being operated to gain operating experience with such a system and on how an in-country seismic system would be used to monitor compliance with nuclear testing bans or restrictions through the detection of regional versus teleseismic signals. The RSTN provides the opportunity for regional seismic experiments including the collection of data for input to the regional seismic discriminant studies being conducted at Lawrence Livermore National Laboratory; i.e., how to distinguish between seismic signals generated by underground nuclear explosions and those generated by earthquakes, mine excavation activities, and other seismic signals. Additionally, the RSTN provides data on the reliability of high technology seismic data collection apparatus operating under field conditions.

An advanced element of DOE's in-country seismic research program is the design, development, deployment, and operation of a regional seismic array system in Norway. This is a cooperative effort between DOE and Defense Advanced Research Projects Agency (DARPA). The DOE and DARPA deployed and began operating an array system in 1984 under existing arrangements between DARPA and Norway. In Fiscal Year 1985, the array will achieve complete operational status and will collect regional seismic data for two to three years. The data from the array will provide an additional basis for evaluating the utility of an array system for verifying compliance with treaties limiting or banning underground nuclear tests. In Fiscal Year 1986, development and installation of a second advanced seismic station or array will begin, in cooperation with cognizant United States agencies.

[Deleted.]

The nonseismic detection (ionospheric and infrasonic monitoring) technology development program efforts in Fiscal Year 1986 will focus on developing equipment and signal processing techniques for operational systems. The ionospheric technique uses over-the-horizon radar for monitoring perturbations in certain levels of the ionosphere caused by shock waves generated from nuclear explosions. Microphone arrays for long-range monitoring of very low-frequency sound waves generated by nuclear explosions that propagate in the upper levels of the atmosphere are used in the infrasonic technique. Both programs have demonstrated the capability of detecting nuclear explosions and are developing the methodology for optimizing measurement and signal processing procedures. The infrasonic and ionospheric monitoring systems would prove to be valuable test treaty verification tools since neither would have to be deployed within the borders of a country to verify its compliance with any nuclear testing constraints. To this end, Fiscal Year 1986 emphasis will be on the design and development of equipment and processing techniques of prototype systems for supplementing existing verification methods.

ONSITE MONITORING

The Peaceful Nuclear Explosions Treaty (PNET), which like the Threshold Test Ban Treaty (TTBT) is not ratified, provides for the United States and the Soviet Union to conduct observations and examinations on each other's territories for certain peaceful nuclear explosions.

DOE has an initial equipment suite and has identified personnel with the skills needed to implement an onsite program to exercise United States monitoring immediately, if and when the PNET is ratified. The Fiscal Year 1986 funding request will enable DOE to maintain the equipment in readiness. However, if the treaty is ratified, additional resources will be needed to assemble an operational team and to fabricate specialized deployable equipment for the long term.

[Deleted.]

ANALYTICAL SUPPORT

Our work in Analytical Support provides valuable assistance to the Departments of State, Defense, and Commerce; the Arms Control and Disarmament Agency; the Intelligence Community; and the Nuclear Regulatory Commission, as well as DOE.

The Fiscal Year 1986 budget request for analytical support activities is $21.0 million, a $1.5 million increase over the Fiscal Year 1985 level of $19.5 million. [Deleted]

ARMS CONTROL

DOE's responsibility for the United States nuclear weapons program makes essential its participation in the arms control process. Our capability to meet national security requirements demands continuing assessment of the impact of arms control policy on the nuclear weapons complex. At the same time, United States arms control policy must take account of the Nation's nuclear weapons requirements. This relationship between the nuclear weapons program and arms control requires active DOE participation in arms control policymaking, negotiation, and implementation.

We have the primary responsibility for Defense Programs activities in the interagency and international arms control arenas. We participate in the Non-Proliferation Treaty (NPT) Review Conferences, the United Nations Conference on Disarmament (CD), and negotiations on possible nuclear test limitation agreements. We participate in the Interagency Working Group on Nuclear Weapons Testing and in the Arms Control Verification Committee (ACVC). We also participate in the CD Backstopping Committee which provides direction to our United States delegation to the CD in Geneva. We send a representative to serve on the United States delegation to the CD during the 24-week session in Geneva.

Two CD working groups now use DOE's technical expertise: one is negotiating a treaty banning radiological weapons; the second is investigating verification and compliance issues associated with a Chemical Warfare Treaty. DOE also provides representation to the CD Ad Hoc Group of Scientific Experts, which is conducting a data exchange program on information relating to an international network of seismic facilities.

EXPORT CONTROL, TECHNOLOGY TRANSFER, AND INTERNATIONAL EXCHANGE

We are responsible for reviewing proposed nuclear and energy-related exports, technology transfer, and international cooperation and exchange agreements to ensure their consistency with United States national security and nonproliferation objectives.

Because of the unique experience and resources of the DOE nuclear weapons complex, we have been called upon to support the DOD in identifying emerging and militarily critical technologies and to support the Departments of State and Commerce in carrying out their responsibilities for controlling United States exports and international cooperation and exchanges. We are currently intensively examining these issues to ensure that the controls, as written, are adequate and to recommend changes where appropriate. It is also the responsibility of DOE to determine for the Executive Branch whether a request for a Nuclear Regulatory Commission license to export nuclear materials, reactors, and equipment specifically designed for nuclear purposes would be inimical to United States national security interests. Similarly, our expertise provides the basis for control of naval and maritime nuclear propulsion technology in coordination with DOE's Office of Naval Reactors.

In addition to applications for DOE authorization to assist foreign nuclear activities, we review about 200 NRC export license applications a year and about 6,500 Department of Commerce export license applications. In 1984, we acted on about 92 percent of the Commerce cases within the initial 30-day period mandated by the Export Administration Act. The remaining 8 percent required additional time for detailed technical analysis and, in some cases, review by the Subgroup for Nuclear Export Coordination (SNEC). (The SNEC is an interagency panel established to consider and consult on proposed nuclear exports and related issues.

WEAPONS INTELLIGENCE

Weapons intelligence within the Department of Energy is responsible for supporting DOE and Intelligence Community collection, identification and analysis of data on foreign weapons, [deleted].

PROLIFERATION INTELLIGENCE

The DOE proliferation intelligence program supports U.S. nonproliferation goals with a program of studies of nuclear capability in potentially proliferating countries.

[Deleted.]

The foreign technology assessments [deleted] activity examines directed energy-related technologies, computers and microelectronics, technology transfer, and nuclear terrorism. This activity supports decisionmaking on export case reviews, foreign cooperation visits and programs, and strategic analyses at both DOE and other U.S. Government agencies in the carrying out of legislative and executive mandates. This effort includes support to the National Security Council and Senior Interagency Group for Technology Transfer (SIG/TT). The effort for these activities will continue at the Fiscal Year 1985 level.

[Deleted.]

ENERGY ASSESSMENTS

Current intelligence on energy security meets the Department's needs for information on the prospects for disruption of oil supplies due to political, economic, and social instabilities within major producing nations of the Persian Gulf. The status of the Iran/Iraq conflict plus potential future threats or conflicts among the states must be analyzed and reported relative to the vulnerability and recovery capability of this vital world energy source as it may influence United States energy supply.

[Deleted.]

CAPITAL EQUIPMENT

The Fiscal Year 1986 request for capital equipment for the Verification and Control Technology program is $5.6 million, a $3.6 million increase over the Fiscal Year 1985 figure of $2.0 million. This year's request adds funds for automating the processing of intelligence and crisis management information within the Department. Included is an upgrading of communication between DOE Headquarters in the Forrestal building and the DOE Emergency Operations Center in Germantown, Maryland. The Germantown facility is responsible for processing all of the Department's intelligence and crisis management information during other than regular duty hours. The application of automatic data processing techniques to the handling of the Department's intelligence and crisis management information will improve the Department's ability to respond to oil supply disruptions, nuclear accidents, reentry of nuclear power space vehicles, support for nuclear terrorist incidents, and support for the Nuclear Emergency Search Team.

Additionally, this capital equipment request supports research, development, test, and production activities through the provisions of test equipment and instrumentation. There is a continuing need to update test equipment at the Sandia National Laboratories, the Lawrence Livermore National Laboratory, and the Los Alamos National Laboratory. Most equipment is small-scale bench test equipment such as oscilloscopes, electronic calibration devices, and small-scale electronic support devices.

CONSTRUCTION

To ensure that we can meet requirements for spaceborne sensors in the late 1980's and beyond, the Department is requesting $4.5 million to continue work on the Space Science Laboratory (Project 85-D-171) at Los Alamos. Work on the laboratory has been started under the Fiscal Year 1985 appropriation of $1.0 million. The funds requested in Fiscal Year 1986 will permit the work to move smoothly from engineering design to construction. The Laboratory will be completed by Fiscal Year 1987 at a total estimated cost of $7.5 million.

This facility will enable us to perform an unprecedented planned workload of technology development, fabrication, and operational support activities. The new capabilities it will provide are essential if the Department is to carry out several classified research and development projects which will be very important to the Nation's security in the 1990's. These projects pose significant technological challenges to our scientists and engineers, in some cases calling for development of virtually new technologies before even prototype sensors can be deployed. Present facilities can barely meet the technical demands of current research and development and fabrication activities, much less the development of new technologies and the stepped-up fabrication and delivery schedule. In addition to impeding the successful development of new technologies, our present facilities would probably increase the cost because the sensors would have to undergo manual testing, which not only is less likely to meet stringent quality assurance standards but also is very time consuming and increases the risk of missing a delivery commitment.

Another factor contributing to the need for the new facility is that most satellites on which DOE sensors will ride will be deployed by the space shuttle. Unlike satellites launched by unmanned rockets, shuttle-deployed satellites must meet more rigorous quality and testing standards to ensure the safety of the shuttle crew.

PROGRAM DIRECTION

Program direction funds provide for the salaries, benefits, and travel expenses for 67 FTE's associated with the management and direction of the Verification and Control Technology program at DOE Headquarters in Washington, D.C. These employees are responsible for technical and analytical program management of field activities, and execution of Headquarters staff functions.

The requested funding of $3.8 million, an increase of $.6 million over the Fiscal Year 1985 figure of $3.2 million, provides for full year staff support, employee advancement, and normal administrative costs.

This completes my statement. If there are any additional questions or requests, I will be glad to respond now or at a later date.

The following questions were submitted to the witness to be answered for the record:

AIRSPACE RESTRICTIONS

Mr. **Stratton**. The Department of Energy has published in the Federal Register an Advance Notice of Proposed Rulemaking regarding proposed airspace restrictions over several of its facilities. What is the purpose of these restrictions?

Mr. **Cook**. Over the past several years, the Department of Energy (DOE) has been engaged in a systematic security upgrade program which has resulted in significant improvements at our critical facilities. Specific actions have included: increasing the size of our protective forces; improving training, equipment, and physical conditioning of our protective force officers; developing special SWAT-type response teams for tactical emergencies; acquiring helicopters for security surveillance and response; installing perimeter barriers equipped with intrusion sensors, hardened guard towers, vehicle barriers at site perimeter entrances, and improved exterior and interior detection systems; and upgrading central command and control facilities. At the same time, the DOE has undertaken a number of other initiaties, such as: enhancing our inspection and evaluation program to test field office and contractor activities; refining our coordination with the Federal Bureau of Investigation and the Department of Defense for outside assistance in times of crisis; and, of course, our request for overflight restrictions at nine sites.

While perimeter barriers, alarms, guard towers, and mobile patrol forces serve to deter an delay ground based penetrations, no such capabilities other than visual sitings currently exist to assist in preventing intrusion of facility airspace. We recognize that established prohibited airspace will not, in itself, stop terrorists or other dedicated attackers, but by limiting flights over DOE facilities, as proposed our protective forces will know that aircraft entering DOE airspace are unauthorized and take the necessary actions. We recognize, also, that establishing prohibited airspace over DOE sites must be accompanied by technology and procedures through which intruders into that airspace can be detected, the intruding aircraft identified, the protective forces alerted, and the information passed on to the Federal Aviation Administration and the Federal Bureau of Investigation for enforcement action.

Please be advised that the Department has initiated action to refine our technological capabilities, to enhance our internal operational procedures, and to secure cooperation among Federal departments on actual incursions. We would add that the Department of Energy has made every effort to minimize the negative impact of our request on the flying public by limiting the size and scope of the prohibited airspace.

Mr. **Stratton**. Where are these facilities located?

Mr. **Cook**. The proposed airspace restrictions are for:

Hanford-Richland site, Richland, Washington; Idaho Falls site, Idaho Falls, Idaho; Oak Ridge site, Oak Ridge, Tennessee; Los Alamos site, Los Alamos, New Mexico; Pantex Plant, Amarillo, Texas; Rocky Flats Plant, Golden, Colorado; Lawrence Livermore National Laboratory, Livermore, California; Lawrence Livermore National Laboratory—Site 300, Tracey, California.

Mr. **Stratton**. What is the status of the rulemaking action?

Mr. **Cook**. An Advanced Notice of Public Rulemaking was published by the Federal Aviation Administration (FAA); public hearings were held by the FAA, with DOE represented on their panel, in Washington, DC, and at each of nine sites; and the FAA has forwarded a document containing the expressed areas of concerns and questions to DOE for response. The DOE's response to this document will form the basis for the FAA's publication of a Notice of Public Rulemaking, which is the next step in the rulemaking procedure.

CENTRAL TRAINING ACADEMY

Mr. **Stratton**. In May of 1984, the Secretary of Energy approved the establishment of a Central Training Academy for Department of Energy protective force personnel. Where were these personnel trained prior to the establishment of the Academy? Why is the Academy necessary? What courses are offered? How many personnel are expected to be trained each year?

Mr. **Cook**. Traditionally, protective force personnel were trained onsite at DOE field facilities by DOE and DOE contractor instructors. Additional training has been provided by other Federal, State, and local agencies. Expert consultants in areas such as SWAT training and hostage negotiations were also utilized by the Department. Training conducted at the individual field facilities was based on Headquarters guidance. However, the results achieved were of varying quality and not always adequate. The Central Training Academy was established to provide the necessary standardization and consistency needed to significantly improve the overall quality and effectiveness of this training. The Academy will train approximately 1,200 security personnel annually in Special Weapons, Tactics, Hostage Negotiations, Crisis Management, Executive Protection, Inspection and Evaluation, and Professional Instruction Techniques for training officers.

SOUTH AFRICAN SITUATION

Mr. STRATTON. It has been reported that 40 Americans are working in South Africa in violation of U.S. nonproliferation laws. Is this true?

Mr. COOK. The Department of Energy (DOE) has determined that as many as 29 U.S. citizens are in South Africa under contract to perform duties in connection with the operation of the Koeberg nuclear power reactor without the required authorization of the Secretary of Energy. We have informed the Americans of applicable U.S. laws and regulations and of the legal consequences of noncompliance. We are working closely with the Department of State to resolve this problem as quickly as possible.

Mr. STRATTON. It has been charged that DOE knew about this situation for over a year and failed to take action. Can you comment?

Mr. COOK. This charge is not true. In October 1984, DOE received an unsubstantiated report that U.S. citizens were employed as reactor operatiors at the Koeberg nuclear power reactor in South Africa. DOE immediately initiated steps to obtain additional information.

IMPLEMENTATION OF SECTION 148 OF THE ATOMIC ENERGY ACT

Mr. STRATTON. What is the status of the implementation of section 148 of the Atomic Energy Act?

Mr. COOK. Over the past two years, we have held four public hearings and received a number of written comments from the public on proposed regulations implementing section 148 of the Atomic Energy Act. We have made changes to these proposed regulations which clarify their intended scope and which accommodate many of the public's concerns. We are in the process of preparing the regulations for final issuance. The regulations will then be implemented within the Department by means of an agency order. In this period prior to issuance of final regulations, we have implemented section 148 on an interim basis. Authority to withhold information under section 148 has been applied sparingly, with highly centralized review and denial procedures to insure consistency during this pre-final regulations phase. We have had many Congressional inquiries concerning the status of the section 148 implementation program. All such inquiries have been the result of constituent concerns (except for a recent question from a staff member of the Subcommittee on Oversight and Investigations of the House Committee on Energy and Commerce) which we have been able to satisfactorily address. Most of these constituent concerns were based on a misinterpretation of the proposed regulations. The constituents thought that the regulations would make it illegal for persons to protest the transport of nuclear weapons. This is not the case. The final regulations clearly address this point. We are confident that we will continue to have an effective section 148 implementation program which balances the public's right to know about its government with the need to protect certain limited areas of unclassified but sensitive information.

NUCLEAR MATERIALS COURIER POSITIONS

Mr. STRATTON. What are the duties and requirements unique to the DOE Nuclear Materials Courier positions which justify their being brought within the coverage of a 20-year retirement law?

Mr. COOK. The work is very demanding and places a significant physical burden upon even the youngest and better conditioned members of the force. Couriers average 14.5 days (up to twenty-four hours a day) in travel status each month moving nuclear weapons and strategic quantities of special nuclear material throughout the contiguous United States.

The primary mode of transport used for shipping this very sensitive material is a tractor-trailer. Couriers operate and sleep in this equipment as well as accompanying escort vehicles from shipment point of origin to point of destination, making stops only for food and fuel. The length of a segment of a trip may last up to 60-65 hours (maximum) before rest in a motel. The average trip is five days; however, trips may be extended up to 10 days. Also, couriers are not employed to defend fixed locations. Rather, relying upon their own conditioning, tactical skills, and each other, they must be continually prepared and ever-vigilant to defend highly sensitive material vital to national security under an ever-changing physical environment. This requires a level of fitness and physical demands not found in any other federal, state, or local law enforcement positions.

Because of the above, couriers are required to meet the following recurring qualification requirements:

Physical Fitness Requirements.—Every three months couriers must qualify alternately on either the mile in eight minutes or 440 yards in one minute and 25 seconds.

Firearms.—Every three months couriers must qualify with the handgun, rifle, grenade launcher, and shotgun.

Driving.—Couriers must pass a check ride annually.

Physical Examination.—Couriers are required to take and pass a comprehensive physical examination annually.

The responsibility for transporting and protecting nuclear weapons, the continued travel away from home and family, and the numerous stringent qualifying requirements place a tremendous burden on a courier. As couriers become older, the combination of the above factors contributes to a higher yearly attrition rate which results in additional costs to the government, both monetary as well as the lack of an experienced work force. This situation can only get worse as the courier force becomes older without the benefit of a twenty-year retirement.

Mr. STRATTON. What is the basis for the physical fitness requirement which all DOE Nuclear Materials Couriers have to meet?

Mr. COOK. In 1980, a contract was awarded to Dr. Hemming A. Atterbom, Director of Human Performance Laboratory, University of New Mexico, a nationally recognized authority in exercise physiology, to conduct a job-related physical fitness review. His efforts resulted in the development of a new standard which was placed into effect December 31, 1983.

In accomplishing this review, Dr. Atterbom, in conjunction with DOE management, concluded that couriers will likely have to engage in infantry-type combat operations in order to prevent seizure of a shipment by an armed enemy. Typically, such activity will consist of movement on foot through terrain, while intermittently exchanging small-arms fire. Movement would have to be rapid, and a certain amount of combat gear (weapons, ammunition, communication gear) will load the courier down. Simply stated, the combat effectiveness of couriers would be determined, to a great extent, by their capacity to move quickly through difficult terrain while retaining optimum effective fire power.

The physical fitness requirements which all TSD couriers must meet are considered to be an accurate reflection of the anticipated combat performance.

Our TSD system must provide the ultimate protection for nuclear weapons, special nuclear material, and weapon components. The prescribed physical fitness of our couriers plays an integral and necessary role in this system of protection. Not only do we consider the required level of fitness to be a matter of necessity in our effort to assure the desired level of protection for our shipments, but we also believe that any lessening of the physical fitness standards could result in an unacceptable level of cardiovascular risk to the less-fit courier if he/she is ever required to respond to an extreme emergency, such as would be involved in repelling an armed attack. Similarly, a high level of physical fitness is essential to ensure the safety and well-being of couriers during extremely stressful tactical training exercises.

Mr. STRATTON. Who is our next witness?

STATEMENT OF DON OFTE, DEPUTY ASSISTANT SECRETARY FOR DEFENSE PROGRAMS, DEPARTMENT OF ENERGY

Mr. OFTE. I am, sir, Don Ofte, Deputy Assistant Secretary for Defense Programs.

Mr. STRATTON. You will address environmental activities?

Mr. OFTE. Yes, sir.

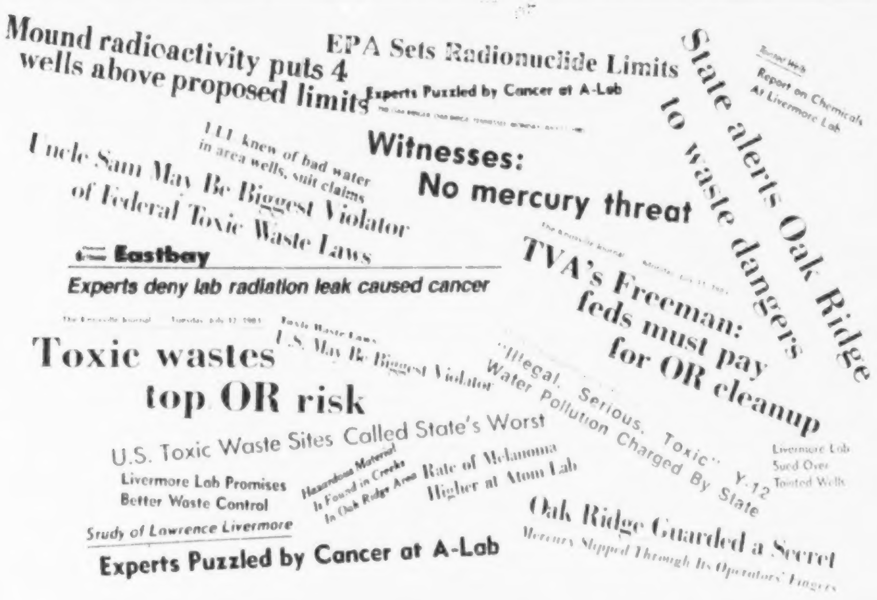
Mr. STRATTON. We would appreciate it if you could try to condense this so that we can wind up here fairly soon.

Mr. OFTE. I have indexed these viewgraphs for a full presentation or just a brief one, sir. Would you like me to condense it to the briefer version? If I can have just a second to sort down to a smaller number of viewgraphs.

Mr. STRATTON. Sure, go ahead. Yes.

Mr. OFTE. Mr. Chairman, we have submitted a statement for the record.

DEFENSE PROGRAMS — WEAPONS ACTIVITIES



Mound radioactivity puts 4 wells above proposed limits

EPA Sets Radionuclide Limits

Experts Puzzled by Cancer at A-Lab

State alerts Oak Ridge to waste dangers

Report on Chemicals At Livermore Lab

TTI knew of bad water in area wells, suit claims

Witnesses: No mercury threat

Uncle Sam May Be Biggest Violator of Federal Toxic Waste Laws

Eastbay

Experts deny lab radiation leak caused cancer

TVA's Freeman: feds must pay for OR cleanup

Toxic wastes top OR risk

U.S. May Be Biggest Violator

"Illegal, Serious, Toxic": Y-12 Water Pollution Charged By State

U.S. Toxic Waste Sites Called State's Worst

Livermore Lab Promises Better Waste Control

Hazardous Material Is Found in Creeks In Oak Ridge Area

Rate of Melanoma Higher at Atom Lab

Livermore Lab Sued Over Tainted Wells

Oak Ridge Guarded a Secret

Mercury Slipped Through Its Operators' Fingers

Study of Lawrence Livermore

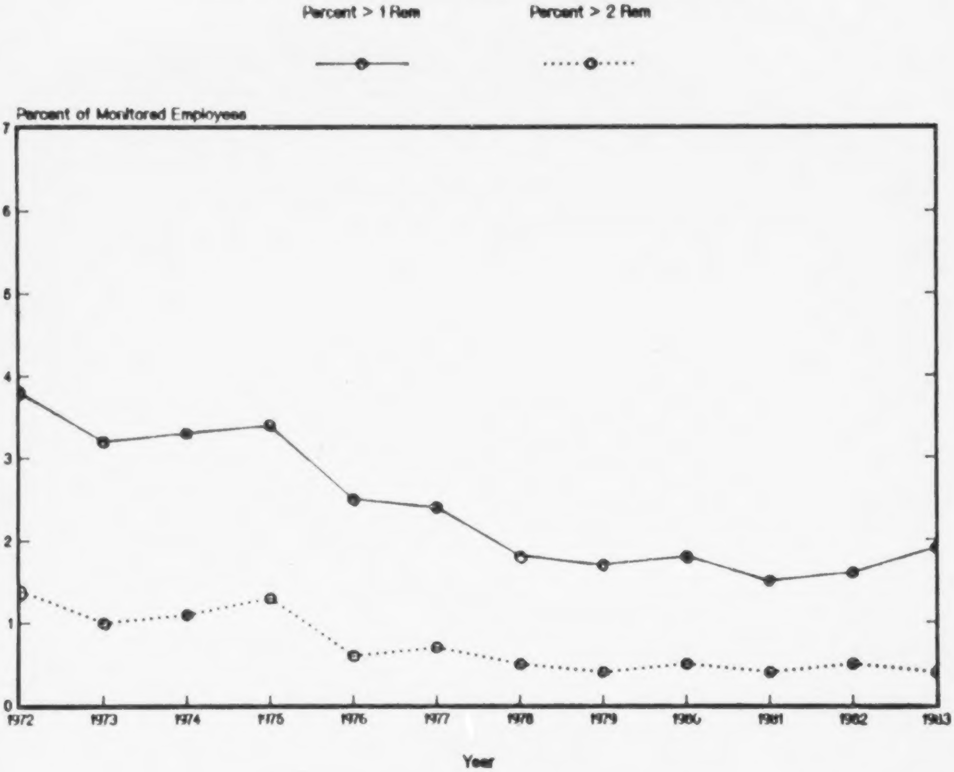
Experts Puzzled by Cancer at A-Lab

MEDIA COVERAGE

Mr. OFTE. I would like to begin with a little montage of the type of headlines we have been receiving lately in the environmental arena. We have been under considerable fire for a lot of perceived environmental shortcomings in the recent years by the press and by——

Mr. STRATTON. Can we get a mike? We are not hearing you too well.

Mr. OFTE. As I was saying, sir, we have been assailed by headlines of this nature for the last couple of years these headlines have been generated by some findings that came out of our own monitoring program or lawsuits or from investigative reporters and the like.



Percentage of DOE Employees Monitored

Doses Greater Than 1 Rem and 2 Rem (5 Rem per Year DOE Standard)

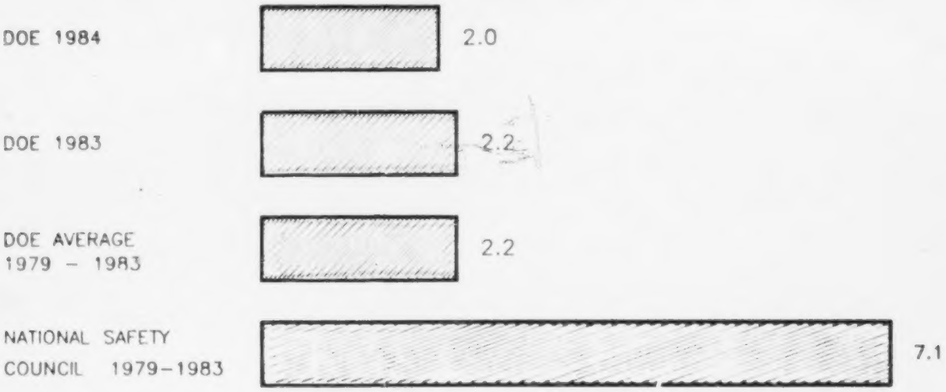
DOE RADIOLOGICAL PROTECTION RECORD

I think, in fairness, we ought to take a look at what our record is over the years in terms of what has been our experience has been with our employees monitored for radioactive exposure. The allowable exposure of employees per year is 5 rem.

What you see there, sir, the upper line, is the percentage of our 100,000 employees we monitor that receive in excess of 1 rem per year. Back in 1973, there were of about 3.8 percent receiving more than 1 rem per year. Now there are less than 2 percent of those employees receiving more than 1 rem per year.

That, I submit, sir, is an outstanding record of employee protection from a radiological standpoint. Likewise, the bottomline shows the number of employees that have received more than 2 rem per year, and there are less than half a percent of those. None of them, not one employee in the entire DOE has received more than 5 rem, the allowable limit, since 1979.

And if we look at what the counterpart experience is over in the commercial sector, we have a far, far better record than they do. So often the claim is made that our employees would be much better protected if we were to have the Nuclear Regulatory Commission regulate us. Again I submit, sir, that our radiological protection program, as far as our employees are concerned, has a better track record than that part of the industrial sector.

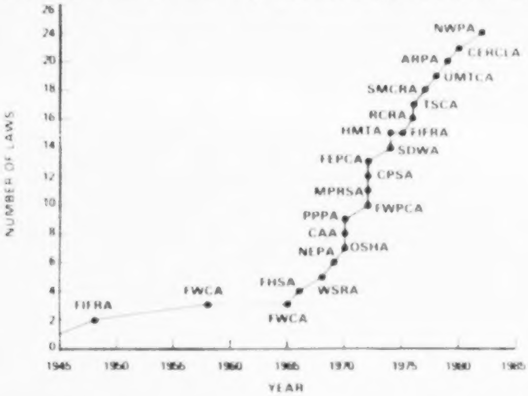


Comparison of DOE and Private Sector Recordable Injury/Illness Incidence Rates (Cases Per 200,000 Work-hours)

I think it is also worthwhile to consider what has our record been in industrial safety? How do we compare with American industry? The bottom bar is what American industry finds is their experience based on lost time accidents. The top three bars indicate what we experienced in 1983 and 1984.

The trend line shows that we are getting better in spite of the fact that we have an increasing workload and less experienced work force.

LEGISLATION RELATED TO ENVIRONMENTAL PROTECTION



FIFRA	FEDERAL INSECTICIDES FUNGICIDE AND RODENTICIDE (1948 1972 1975)
FWCA	FISH AND WILDLIFE COORDINATION (1958 1965)
FHSA	FEDERAL HAZARDOUS SUBSTANCES (1966)
WSRA	WILD AND SCENIC RIVERS ACT (1968)
NEPA	NATIONAL ENVIRONMENTAL POLICY (1969)
PPPA	POISONIOUS PACKAGING PREVENTION (1970)
OSHA	OCCUPATIONAL SAFETY AND HEALTH (1970)
CAA	CLEAN AIR (1970 1977)
FWPCA	FEDERAL WATER POLLUTION CONTROL (NOW CLEAN WATER) (1972 1977)
MPRSA	MARINE PROTECTION RESEARCH AND SANCTUARIES (1972)
CPSA	CONSUMER PRODUCT SAFETY (1972)
FEPCA	FEDERAL ENVIRONMENTAL POLLUTION CONTROL (1972)
SDWA	SAFE DRINKING WATER (1974 1977)
HMTA	HAZARDOUS MATERIALS TRANSPORTATION (1974)
RCRA	RESOURCE CONSERVATION AND RECOVERY (1976 1979)
TSCA	TOXIC SUBSTANCE CONTROL (1976)
SMCRA	SURFACE MINE CONTROL AND RECLAMATION (1977)
UMTCA	URANIUM MILL TAILINGS CONTROL (1978)
ARPA	ARCHEOLOGICAL RESOURCE PROTECTION ACT (1979)
CERCLA	COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (1980)
NWPA	NUCLEAR WASTE POLICY ACT (1982)

HISTORY OF ENVIRONMENTAL LEGISLATION

Now on this graph, sir, we are showing what the history of environmental legislation has been in recent years. The furthest date on the left is 1945, and the flat part of the curve there ends at about 1965. The newest and most modern plant that we have in our entire complex is our Pinellas plant. It was built in the 1956 to 1957 timeframe. So all our plants have been built prior to the onset of this tremendous influx of environmental legislation.

The practices we observed at those plants were acceptable for that timeframe and the buildings were all built to codes that were in existence at that time. The problem we now have to cope with is, how do we catch up and try to, if we can, stay ahead of that type of a layering on of legal requirements that we have for meeting environmental standards?

Mr. STRATTON. Your responsibility is particularly with regard to employees of the Department, is that right?

Mr. OFTE. Well, sir, we have a responsibility for all of our environmental discharges, to meet the standards for water discharge, clean air discharge, and so it is not only for our employees, but we have to be responsible likewise for the protection of the public.

EPA ENVIRONMENTAL STANDARDS

Mr. STRATTON. We had a hearing last year, which you may or may not recall, in which we took to task the Environmental Protection Agency for issuing standards that were virtually impossible to meet. To reduce them, I think you get the exposure standard down to one-half of a rem, as I recall.

Mr. Shwiller was one of these who made the point rather strongly, particularly with regard to uranium mill tailings. We had Mr. Ruckelshaus in. He had just taken over. We tried to convince him that the standards that had been set were totally unrealistic. And he was not too amenable to our suggestion, although subsequently the individual who is largely responsible for setting these unrealistic limits, Mr. Sjobloum, or something like that, subsequently left the agency.

And then last fall, shortly before the election, I read in the press that Mr. Ruckelshaus had agreed that the previously set standards were unrealistic and that they had directed that they be revised. He didn't mention anything about our hearing, but it seemed to fall in line with the recommendations that the committee staff had made.

Then subsequent to that, in fact I wrote a letter to Mr. Ruckelshaus to congratulate him on his seeing the light. But shortly thereafter he resigned. Then, as I recall, some organization went to court and insisted that the new standards which Mr. Ruckelshaus had put into effect with regard to uranium mill tailings were in fact in violation of the EPA basic legislation, or something or other.

And I am wondering just where that stands at the present time. Are you familiar with that?

Mr. OFTE. Parts of it, sir. I will share with you what I know.

I think when you spoke to Mr. Ruckelshaus the first time what EPA had been proposing was limits of 10 and 30 millirems off site for the public, which were unrealistically low limits. What has subsequently been negotiated between the Department of Energy and the EPA are standards that are in consonance with the National Council of Radiation Protection recommendations. So EPA has issued standards of 25 millirems to members of the public who would receive radiation exposure from an atmospheric release on a continuous basis, or 75 millirems if it were on a noncontinuous basis. However, DOE can obtain alternative standards going up to 100 and 500 millirems as appropriate.

Those standards are standards that we can live with within the DOE and our facilities as they operate today. So that process was very helpful in the sense of not having the very unrealistic limits of 10 and 30 that were proposed earlier for the American industry.

Mr. STRATTON. But you are not aware of any litigation that would try to return them to the more unreasonable standards?

Mr. OFTE. No, sir, I am not. But I wouldn't be surprised if there were some, because we are dealing in that kind of a climate all the time now.

Mr. STRATTON. I thought I, I think I saw something in the press, but maybe I misunderstood.

Dr. GILBERT. I am Chuck Gilbert, sir. You may be referring to the fact that after they issued their first draft clean air standards, they then withdrew them and decided they did not need to issue them. Then they came under Federal court order to issue the standards sometime earlier this year, I think it was by January. So they were then forced to issue new standards.

Mr. STRATTON. I see.

Dr. **Gilbert**. It was during that period that we negotiated standards with them that were more palatable to the DOE.

Mr. **Stratton**. I see. So there was a little hiatus there with no standard in effect at all, is that it?

Dr. **Gilbert**. Yes, sir.

Mr. **Ofte**. Well, the standard that was in effect was the one that has been in effect for many, many years. That is 500 millirem to the public. In fact, that is still our standard. We have not implemented the new standards yet, and won't until they pass through OMB.

Mr. **Stratton**. Thank you.

Mr. **Ofte**. Yes, sir.

Mr. **Stratton**. Go ahead. Mr. Klein.

Mr. **Klein**. Mr. Ofte.

Mr. **Ofte**. Yes, sir.

APPLICATION OF THE 100 MILLIREM STANDARD

Mr. **Klein**. Would it—I am trying to get a comparative handle on this thing. Would the hundred millirem continuous, if applied in the situation, prevent a person from moving here and residing in Denver, for example. Or Aspen, or Leadville? Or would it prevent a person from, let's say, becoming a jet pilot in the Air Force or Navy if he was going to fly at, let's say, 20, 30, 40, 50 hours a month? Is that what they mean by continuous exposure?

Mr. **Ofte**. No, sir. When we apply the 100 millirem, we subtract out the natural background. So whatever the natural background radiation is is counted in continuous exposure measures nor are medical x rays. So from the standpoint of regulating our facilities, we subtract the natural background and we control that which is above the natural background.

But you are correct, if you move from here to Denver, you would be moving to a climate where the natural background is indeed well over 100 millirem.

Mr. **Klein**. But my natural background here is different from what it would be in Denver, for example?

Mr. **Ofte**. Yes, sir.

Mr. **Klein**. Or if I were to become a jet pilot again. And so if you applied the same thing, the background of a person who is outside your plant is at one level and maybe 100 or 200 millirem more if he walks inside the plant or works in there.

So what is the difference, I mean, from a health aspect?

Mr. **Ofte**. My personal opinion is that the health difference is negligible at those levels. I think those are very, very low and very conservative exposures, if you will.

Mr. **Stratton**. Dr. Mansfield?

Dr. **Mansfield**. Let me see if I have got this right. You are asking funds to be authorized to reduce exposure to employees by an amount that is much smaller than the background radiation that they are getting already?

Mr. **Ofte**. Well, for employees in our laboratories and plants, we still control them to 5,000 millirem. Five rem is their limit of exposure. So this particular standard does not affect our employees whatsoever.

Dr. **Mansfield**. Substitute the public for employees. Is my statement still correct, that your program asks for money to reduce exposure to the public by an amount that is considerably smaller than their background radiation to which they are exposed in daily living?

Mr. **Ofte**. With the exception of a couple of facilities that are really in question right now, Fernald and the LAMPF facility at Los Alamos, every one of the rest of the facilities in the country operate at levels considerably below the new threshold. That is not a concern, for instance, at Rocky Flats we would still be at a smaller percentage of the 100.

Mr. **Stratton**. You don't have any responsibility to tell people that they can't be exposed to more than five rems?

Mr. **Ofte**. No, sir.

Mr. **Stratton**. Dr. Mansfield seemed to be talking about the general public. That is up to them, isn't it, unless you have some installation where people think that they are getting irradiated because they are within a couple of miles of this or that installation?

Mr. **Ofte**. Sir, we monitor and control our discharge. Based on what we are discharging, we make an estimate of what the people and public would be exposed to and publish it. But we don't try to regulate or control the people at all.

Mr. **Stratton**. Good. OK. Go ahead.

COST IMPACT OF ENVIRONMENTAL LEGISLATION

Mr. **Ofte**. These are the principal acts that are the big drivers of the lists that were on the previous page. Clean air, water pollution, Safe Drinking Water Act, RCRA, CERCLA and Toxic Substances Control Act. These are the ones that impact most on the operation of our facilities.

Mr. **Stratton**. I guess this is probably within the EPA rather than within the Department, but I remember getting into a discussion with Senator Garn on the question of uranium mill tailings. There is a large mill tailings site outside of Salt Lake City. And I had tried to convince him that on the basis of our information in this committee that there was no real danger in those mill tailings as long as you didn't build a house on them or try to undertake Greco-Roman wrestling in the mill tailings.

But he was insistent that the government should move that site and get it out somewhere else, regardless of what radiation was or the hazardous waste, that it was all psychological and you had to see the psychology of those who were complaining about it.

Do you have any responsibility for these piles that have been left from the early Manhattan project, for example?

Mr. **Ofte**. No, sir, the mill tailings belong to Mr. Vaughan in Nuclear Energy. We are not part of that program, sir.

Mr. **Stratton**. Who handles that?

Mr. **Ofte**. The Assistant Secretary for Nuclear Energy within the Department of Energy. Jim Vaughan has that responsibility for the nuclear energy portion of the Department of Energy's budget.

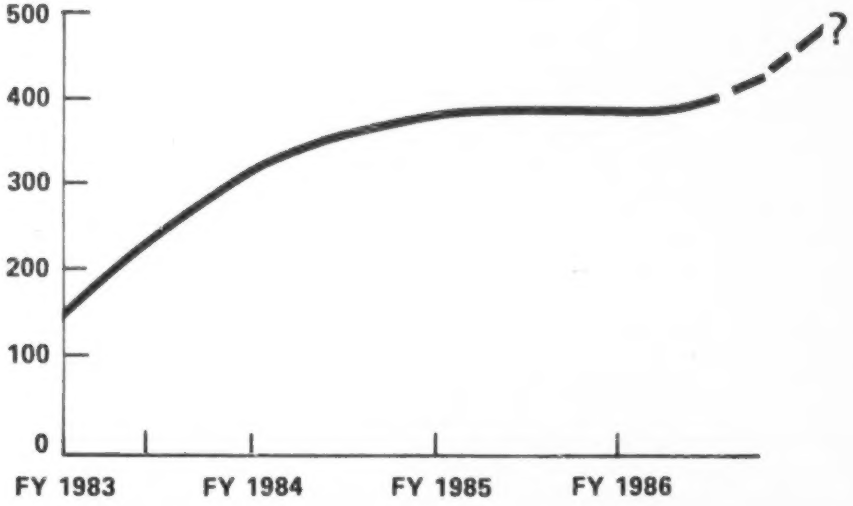
Mr. **Stratton**. I see. OK.

Mr. **Ofte**. We do, I think, face a very uncertain future in the sense of the interagency discussions going on right now. We are engaged in negotiations with EPA at this moment on implementation of RCRA monitoring of mixed wastes, trying to assess what portions of our mixed wastes are subject to the Atomic Energy Act, and, therefore, DOE's responsibility to monitor, and what portion of our mixed wastes will fall to EPA and from EPA to the states to regulate.

We are also in the process of getting security clearances for EPA inspectors and state inspectors so that they can have access to classified information when that is required for them to do their job.

One of the things we found, of course, is that when an existing piece of legislation gets on the books, it is not static. And with succeeding legislative sessions there are modifications to them. In the last session of Congress, the RCRA Act was modified to broaden its scope and cover smaller generators. That modification will probably involve more monitoring of our activities. And I think that subsequent to the Bhopal disaster in India, it is inevitable in this session that there is going to be a good deal of pressure for more legislation focused principally on chemical hazardous waste.

I think both industry and ourselves are trying to anticipate what might come out of that.


ENVIRONMENT, SAFETY AND HEALTH ACTIVITIES
DEFENSE PROGRAMS
(DOLLARS IN MILLIONS)

Mr. OFTE. As far as what it means to us in dollars, we are seeing indeed an increase of our expenditures for environment, health, and safety activities in the Department. We have every reason to think that the upward trend is much more likely than any reduction in the future years. Two of our operations offices, San Francisco and Albuquerque, have looked at the potential consequences of CERCLA from the 1986 to 1990 timeframe and estimate that

CERCLA will cost about $375 million for compliance at those two offices alone.

So compliance at just our old inactive hazardous waste sites is probably going to cost up to $1 billion in the 1986 to 1990 timeframe.

I think that, in closing, sir, what we have been trying to do is what we can, where we can, but there is no question in our minds that we have to comply with the standards that are laid upon us by law. We will make every effort to comply. We want to be good corporate citizens wherever we reside, and try to clean up our act as best we can, sir.

Dr. **Mansfield**. Mr. Ofte, can you clarify the recent technical results that may lead to a significant reduction in the employee exposure? Some results from a new analysis of the Nagasaki-Hiroshima data, I believe it was done at Livermore. In particular, if this results in significantly lower standards for employee exposure, will that change the Rocky Flats operation?

Mr. **Ofte**. I think what you are referring to is the neutron quality index. That could have fairly powerful effects on the shielding requirements that we have at all our facilities where we are doing glove-box type operations, if the neutron content of the exposure is high.

The multiplier that used to be applied for neutron content was 10. The thrust now is to raise that to 50. So depending on the nature of the radionuclides you are working with, you could have anywhere from 40 percent to halving of the allowable exposure. That will cost quite a bit of money to fix if that is the outcome of the neutron quality study that is going on now. We haven't completed that yet.

Dr. **Mansfield**. Does the Department have any forecasts of what that may cost in coming years to accommodate that change?

Mr. **Ofte**. I think I better get that answer to you for the record.

[The following information was received for the record:]

Costs of Changes in the Quality Factors

In the 1980–1981 timeframe, DOE conducted a cost analysis of a then proposed change in the neutron quality factor as applied to blood forming organs from 10 to 50. This was prompted by analysis of Hiroshima/Nagasaki data. The costs varied from tens of millions to hundreds of millions of dollars depending on the range of regulatory options considered. One aspect of that analysis considered reducing the occupational dose limit from 5 to .5 rem/year. That would have cost literally billions of dollars.

The current proposal to increase the quality factor of neutrons also considers a change in x-ray and gamma ray quality factors that were previously equal. Assessing the impacts from changes in these three quality factors will be quite difficult due to the synergistic impacts at DOE production plants where neutron and x-ray exposures are highest.

It is not expected that standards for occupational and public exposure to radionuclides will be changed in response to the quality factor changes, but the way in which we calculate doses will change such that lower exposures will result in higher doses.

The National Council on Radiation Protection and Measurements (NCRP) proposal has two options as follows:

	QF Case 1	QF Case 2
Neutrons	50	25
Gamma Rays	1	.5

	QF Case 1	QF Case 2
X-rays	2	1

Case 1 is expected to be much more costly than Case 2. DOE will conduct a scientific review meeting on April 9, 1985, to examine the scientific/biological impact basis for the proposed changes. Currently, it appears as if the changes are based on findings from experiments with plants and animals. Defense Programs in DOE is in the process of gathering the information required to analyze the costs of the two options. This information should be available in the summer of 1985. A gross estimate of the costs of Case 2, the less expensive of the two, is one hundred to five hundred million dollars in plant costs and ten million dollars per year in operating costs. This assumes liberal regulatory interpretation of the actions required.

Dr. MANSFIELD. Thank you.

Mr. STRATTON. Any questions? Mr. Spratt.

Mr. SPRATT. One question about the Savannah River plant. The defense waste processing facility on the construction there, what is its status now? Does it fall into your jurisdiction, and is there a budget request for it this year?

DEFENSE WASTE PROCESSING FACILITY

Mr. OFTE. Yes; sir, it falls under our consideration, and there is a submission for the defense waste facility.

Mr. HOOVER. That was covered yesterday. I have forgotten the number.

Mr. OFTE. I can't remember the number, sir. Ron Cochran discussed that yesterday. That facility is proceeding very well. We are slightly ahead of schedule, but I cannot remember the total estimated cost.

Mr. SPRATT. Once the waste is vitrified, how do you plan to dispose of it?

Mr. OFTE. In temporary storage at Savannah River until such time as the commercial repository is available to us in the 1998 timeframe. Then we will start shipping to that facility.

Mr. SPRATT. Would you anticipate putting it then in the deep repository, permanent repository that supposedly is now being planned for the 1990's?

Mr. OFTE. Yes, sir.

Mr. SPRATT. Mention was made of a new Clean Water Act requirement which would impose new effluent treatment standards on the Savannah River plant. What specifically was that? I don't think you mentioned it orally, but in your written testimony, you referred to major new effluent conditioning and remedial actions at a cost of $31 million, SRP.

Mr. OFTE. That is part of the cleanup of seepage ponds that were used over the years at Savannah River. As a result of those and sampling around them, we have found tht some organic materials have gotten into the groundwater. So we are discontinuing the use of those seepage ponds.

Mr. SPRATT. Does that relate just to the L-reactor, or does it relate to all four reactors?

Mr. OFTE. We have a total of 80 seepage ponds on the site that will have to be cleaned up, and that $30 million cleans up part of it.

I do have the dollar figure for the defense waste facility at Savannah River. It is $237 million.

Mr. SPRATT. Total overall cost?

Mr. OFTE. Yes, sir, for fiscal year 1986.

Mr. SPRATT. OK. That is the request for 1986. I am sorry. Thank you very much.

Mr. OFTE. Yes, sir.

PREPARED STATEMENT OF DON OFTE

Thank you for providing us the opportunity to discuss those activities that we carry out at our facilities to protect the environment, health and safety of our employees, and the public in general. General Hoover testified yesterday about our management policy and our outstanding record in the employee health and safety arena. Our primary purpose here today is to address the challenge we face in meeting environmental needs and requirements while attaining our mission objectives.

As we discussed yesterday, our FY 1986 budget includes approximately $380 million for programs related to environment, safety, and health. These funds will be used for a variety of activities, ranging from health physics to fire protection to industrial medicine to environmental protection, and includes operating costs, equipment, and construction items. All of these programs have been enhanced in recent years, and those associated with protection of the environment have had particular emphasis, requiring substantial increases in management attention and funding.

We understand that a critical aspect of managing our business involves the long-term protection of the environment. This includes the development and implementation of plans that will bring production plants and laboratories into compliance with the requirements of environmental protection legislation and, at the same time, manufacture the weapons and produce the nuclear materials required by the Nuclear Weapons Stockpile Memorandum within limited resources. This challenging task will involve the cooperation and understanding of the Congress.

In the near-term, our objective is to meet the regulatory requirements in the most cost-effective manner as possible. In the future, we will undoubtedly be faced with greater costs to meet the evolving Federal and State regulations and our environmental protection responsibilities.

HISTORY

The Atomic Energy Act of 1954, established the requirement to conduct nuclear weapons research, development, testing and production, while ensuring the health and safety of the public and protecting the environment. For over 35 years, the Department of Energy (DOE), and its predecessor agencies, have conducted programs designed to protect the health and safety of its workers, and the public, including systems to safety manage radioactive materials.

Environmental monitoring reports are prepared for each of our facilities, and are available to the public.

What was accepted industrial practices nationwide in the 1950's and 1960's became unacceptable in the 1970's and 1980's. Public concern for the protection of the environment for future generations increased motivated, in part, by the immediate effects of industrial and municipal waste disposal practices increased. Legislation and regulations were extended to Federal facilities, requiring the Department of Energy's Defense Programs to undertake numerous compliance actions. In particular, the Clean Air Act; the Clean Water Act; the Resource Conservation and Recovery Act; the Toxic Substances Control Act, and the Comprehensive Environmental Response Compensation and Liability Act now require increased resources for strict compliance.

LEGISLATION

Over 50 pieces of Federal environmental safety and health legislation now have some affect DOE programs. Of these, the following laws have the greatest impact on Defense Programs activities:

Clean Air Act of 1963 and Amendments of 1967, 1970, and 1977—established controls for radioactive and nonradioactive emissions to the atmosphere.

Federal Water Pollution Control Act Amendments of 1972 and Amendments of 1977 and 1978—established control of pollutants discharged into the Nation's water.

Safe Drinking Water Act of 1974—established safe drinking water standards and a national program to prevent underground injections that would endanger drinking water sources.

The Resource Conservation and Recovery Act of 1976 (RCRA) and Amendments of 1984—established regulatory authority for active waste sites involving generation, storage, treatment, transportation, and disposal of hazardous waste.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund)—required identification of inactive waste sites, reporting and cleanup of hazardous substances.

Toxic Substances Control Act of 1976—established controls for disposal of polychlorinated biphenyl (PCB) and other toxic substances.

National Environmental Policy Act of 1969, and Amendments of 1970 and 1975—Required interdisciplinary integration of environmental factors in Federal agency planning and decisions.

In addition to Federal legislation, we are also affected by the requirements of the states within which we operate. Defense Programs has major facilities in 14 states, with each passing legislation and promulgating regulations related to protection of the environment.

DOE IMPLEMENTATION

In implementing Federal legislation, DOE utilizes independent organizations to establish policy and assure compliance; with line managers responsible for execution within Departmental guidance. The DOE Assistant Secretary for Policy, Safety and Environment is responsible for policy and oversight activities, including development of Departmental guidance, and appraisals. Each line official utilizes the agency-wide policy in preparing program and site specific plans to meet their particular situation. Regulatory requirements are identified through continued interaction with Environmental Protection Agency (EPA), state and local government agencies. Implementation of these requirements is carried out by our operations offices and their contractors.

In Defense Programs we have established the Office of Security and Quality Assessment to provide specific independent oversight in environment, health and safety matters. One major responsibility for this office is to develop a management strategy that results in a detailed five year Environmental, Safety and Health Long Range Plan. The strategy has three phases: assessment of the present compliance; prioritization of corrective actions; and tracking compliance progress. The assessment phase is underway, and some corrective actions are underway. Remaining corrective actions will be prioritized and incorporated into the five year Environmental, Safety and Health Long Range Plan which will form the basis for budget requests. Included in the assessment is the identification of assumed risks which might lead to curtailment of faci~~lity operations i~~f corrective measures are deferred.

PROGRAMMATIC IMPACTS

Most DOE nuclear materials and weapons production facilities were built long before the enactment of current environmental legislation and regulations. The impacts of the recent environment regulations include operational changes, modification and construction of facilities, and higher risk of legal challenges. Funds have been made available to conduct assessments to identify and define noncompliance areas and to implement compliance strategies. For areas where there are jurisdictional disputes or uncertainties in regulatory requirements, DOE operations are vulnerable to increased costs and legal challenges.

For example, certain wastes previously acceptable for disposal by land burial are currently being stored for future treatment/disposal thereby resulting in construction of facilities as well as double handling and higher operating costs. Given the fact that we are still in the stage of performing assessments and implementing interim measures to protect the environment, our requirements for operating expenses exceed those for capital equipment and construction funds. For FY 1986, about $280 million of the $380 million ES&H funding requests are for operating expenses.

The regulatory compliance processes require extensive interactions with both Federal and state regulators and the public. Negotiations with regulators and preparation of environmental documentation must be accomplished by experienced management and staff personnel, thus making them unavailable for production operations. Similar impacts are experienced in collecting and analyzing the voluminous data required to conduct these negotiations, complete permit applications, and to comply with the reporting requirements.

EXAMPLES OF PROGRAMMATIC IMPACTS BY LEGISLATION

Clean Air Act

The Clean Air Act requires DOE to modify its facilities and operations to reduce radioactive emissions. This resulted from a recent court decision which did not agree with the EPA conclusion that no regulations were warranted for DOE facilities. Examples of projects to meet these Clean Air Act requirements include $26.5 million in projects at the Y-12 Plant in Oak Ridge, Tennessee; Feed Materials Production Center (FMPC), Frenald, Ohio; and RMI Extrusion Plant, Ashtabula, Ohio. Another project is at the Los Alamos National Laboratory (LANL) Meson Physics Facility stack discharge modifications will cost an estimated $4.5 million. In addition, we will need funds for capital equipment, or general plant projects, at other sites to upgrade or replace equipment to comply with the Clean Air Act. New standards promulgated in early February May require the construction of additional emissions control devices.

Clean Water Act

The Clean Water Act is currently the statute with the most impact to the Defense Programs sites. At Savannah River Plant, South Carolina, recent legislation has resulted in major new effluent conditioning and remedial actions at a cost of $31 million in FY 1986 and a total cost of $198 million. At the Y-12 Plant, Oak Ridge, we have aggressively pursued investigations of the surrounding environment pursuant to the Complaint and Order issued by the Tennessee Department of Health and Environment. Assessments and remedial actions are expected to cost over $30 million from FY 1984 through FY 1987, with at least $8 million to be spent in FY 1986. One of the requirements at Y-12 stemming from the Clean Water Act is the application of best available treatment for metals, toxic organics, and other pollutants. Three examples are the Steam Plant Waste Water Treatment Facility with a TEC of $4.6 million, the West End Treatment Facilities costing $6.6 million, and a $15 million project to reduce mercury in plant effluents. Total Oak Ridge Operations expenditures for ongoing Clean Water Act compliance are on the order of $53 million in capital dollars and $7 million in operational costs.

Lawrence Livermore National Laboratory (LLNL) plans to spend $2.8 million in FY 1986 for assessment of groundwater contaminated with industrial solvents. The EPA has proposed LLNL for the National Priorities List as a result of this and other problems. We are currently working with the State of California to define the vertical and horizontal extent of the contamination. In FY 1984, we analyzed over 630 soil samples and 100 water samples, drilled six deep wells and examined seven existing wells at a cost of $1 million. The ultimate remedial action may be pumping and aerating the aquifer at a cost of several million dollars.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act requires that hazardous wastes be managed and disposed of in a prescribed manner. We propose to initiate a program in FY 1986 to assess the available technology and, where necessary, to develop new technology for treatment of hazardous wastes generated in our operations. This program is expected to cost $6 million in FY 1986.

At the Lawrence Livermore National Laboratory the existing storage and processing facilities for hazardous waste have numerous RCRA deficiencies, which require the separation of waste, spill retention, and incinerator operation. A new facility is being proposed with a TEC of $38 million. Interim upgrades are currently being implemented to correct operational deficiencies and various noncompliance items at a TEC of $2 million.

Modifications have been underway at the Savannah River Plant since FY 1983 for spill containment facilities at the four production reactors, coal-fired electrical generation plants, and process development laboratories. The modifications are required to contain chemical spills for recovery, neutralization, adjustment of pH of aqueous effluents, re-drumming, construction of storage facilities, and incineration facilities and for other regulatory requirements such as fences, utilities, and buildings. SRP plans to spend $8.6 million in FY 1986 to complete the final phase of a program with a cost of $22.6 million.

Also, $1.2 million will be spent at the Y-12 Plant in FY 1986 for construction of waste storage areas.

Comprehensive Environmental Response, Compensation, and Liability Act

Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) requires identification, evaluation, and remedial actions for abandoned waste disposal sites. Each of our operations offices currently has a comprehensive evaluation underway to identify potential sources of environmental contamination, evaluate environmental effects, and initiate remedial action as required. These programs are multiphased and will extend over a number of years. At Oak Ridge, Albuquerque, San Francisco, and Savannah River Operations, we plan to spend about $15 million in FY 1986 on this effort.

Superfund requirements are also being applied to landfills at active sites. For example, tritium and other contaminants have appeared in vegetation and groundwater samples taken near LLNL landfills. Additional investigation is underway to identify and characterize the sources and transport pathways and to determine if there is an imminent hazard to the environment. Existing disposal pits are near capacity or potentially leaking, and the permitting process for a new land fill could take as long as three years, action must be initiated now to explore disposal alternatives. If no action is taken, existing landfills may be filled before a new treatment/disposal option is permitted. The cost of the landfill program at LLNL is currently $15 million.

Toxic Substances Control Act

This act controls the manufacture, distribution, and use of substances believed to pose unnecessary risks to human health or the environment. Our primary effort under this legislation is the removal and cleanup of the potential carcinogen polychlorinated biphenyls (PCB). Y-12 Plant plans to spend $12.6 million for removal of PCB's from electrical transformers. Additionally, Albuquerque will spend a total of $18 million for PCB removal and cleanup, of which $7.5 million will be spent in FY 1986.

National Environmental Policy Act [NEPA]

The Council on Environmental Quality regulations implementing NEPA require the preparation of environmental impact statements (EIS) for major Federal actions with potential significant environmental effects. Public participation is required in the scoping process for the EIS, as well as reviewing the draft EIS.

Proper implementation of the NEPA process is necessary to the timely achievement of program goals. For example, the restart of the PUREX facility at the Hanford site was scheduled for April, 1984 and the L Reactor at the Savannah River Plant was planned restart in October 1983. An EIS was prepared for the PUREX restart proposal which resulted in the smooth restart ahead of schedule. For L Reactor, an environmental assessment was prepared, with a finding of no significant impact. This NEPA approach resulted in legal challenges and and Congressional action directing DOE to prepare an EIS prior to the restart of L Reactor. Completion of the EIS and implementation of mitigation actions identified through the EIS process will delay the restart of L Reactor by 2 years.

We are currently in the process of preparing EIS's on the proposed Process Facility Modifications to the PUREX Facility and developing the strategy for high-level radioactive/tranuranic wastes disposal at the Hanford site. Other proposed actions are under consideration by the Department to determine the needed NEPA documentation, or for preparation of an Environmental Assessment (EA) to determine the need to prepare EIS's. Based on past experience preparation of a typical EIS costs in excess of $1 million.

PAPERWORK AND REPORTING REQUIREMENTS

One of the major impacts of the evolving environmental legislation is the proliferation of paperwork associated with additional data gathering, and analysis, permit applications, and routine and abnormal event reporting. Requirements for permits, public hearings, monitoring, and reporting are typically applicable to each unit process or activity, thereby multiplying environmental staff needed to assure compliance and communication with regulating agencies. These requirements have caused DOE and our contractors to hire new staff or divert existing staff from other activities. We have added more than 400 "environmental related" staff in the last two years.

LEGAL IMPACTS

There has been increased litigation contesting the DOE's decisions in meeting regulatory requirements. Numerous legal options are available to those who do not believe that the DOE is acting quickly enough, or meeting the current requirements. These legal options have affected the private sector, DOD, NRC, the and the EPA, States, as well as DOE. For example, in the last 5 years about twenty environmental noncompliance lawsuits have been filed against DOE operations having national security responsibilities. Significant resources are being devoted to respond to these challenges.

NATIONAL SECURITY IMPACT

Under the Department of Energy Reorganization Act, the DOE's Defense Programs has been mandated to protect certain information generated and used in meeting our national security mission and in supporting the government's nonproliferation policy. Compliance with environmental regulations requires that Federal, State, and local agencies have access to certain information on sensitive defense production activities. Although most information required by the regulations is not classified, in some cases, the information obtained could be used to deduce production rates of materials and processes. The dilemma is obvious: we must meet our regulatory responsibilities while protecting national security information. Through Memoranda of Understanding and security clearances for State, Federal, and local regulators, we do provide needed information to the regulatory organizations.

FUTURE UNCERTAINTIES

The impacts we have described will change through specific implementation of existing regulations and new legislation.

DOE is conducting discussions with the EPA on a variety of issues, most notably the application of RCRA to DOE hazardous waste streams also containing radionuclides; called "mixed waste". Other discussions are underway between operations offices and the states concerning the extent and means by which the States will exercise their responsibilities.

The legislative calendar for environmental matters will be full during this session of Congress. In addition to several reauthorization actions, we understand that several new legislative initiatives will be introduced, each impacting our programs. Recent implementing regulations to the Clean Air Act for radionuclides may require some changes in our mode of operation and level of reporting for DP installations, including those below the de minimis emission limits for public health protection. Because these regulations were just published (February 6, 1985) and uncertainties exist, it will require additional time to evaluate the budget impacts.

Another act that we have not discussed so far is the Price-Anderson Act. Its reauthorization with the liability protection is important to the DOE's government-owned, contractor-operated production complex.

In a rider attached to Public Law 97-414, Orphan Drug Act of 1983, Department of Health and Human Services was tasked to develop radioepidemological risk tables that will serve as a basis for compensation to individuals exposed to ionizing radiation. The DOE has submitted comments on these tables to the Office of Science and Technology Policy's Radiation Research and Policy Coordination (CIRRPC). We understand that Secretary Heckler has those comments, and those of the National Academy of Science, and will transmit the HHS position on these radiation compensation tables to Congress in the near future. There are a number of uncertainties and limitations inherent in the presently available data. The applications of the radioepidemiological tables could have wide ranging implications to the DOE programs and efforts are underway to assess the impacts of their use.

Uncertainties also exist regarding the future requirements of RCRA. Small quantity generators of hazardous wastes are to be regulated under the RCRA Amendments of 1984, this will greatly expand our regulated activities. The number and types of wastes to be subjected to regulation under RCRA may change significantly based on a requirement for EPA to identify as yet unspecified additional waste characteristics as a basis for listing a waste as hazardous. The placement of facilities governed by RCRA may also change, based on a requirement that EPA must, within 18 months of enactment, promulgate regulations governing the acceptable locations of hazardous waste facilities. Current seepage basin and land disposal operations may have to be phased out. All of these uncertainties will bear on our ability to define our resource requirements.

SUMMARY

In summary, the Defense Programs' production and research facilities have operated safely and successfully for more than 35 years. We have initiated a major effort to meet the challenges imposed on us by the changing environmental requirements. We continue to assess various strategies to achieve the lower acceptable risks to the public and the environment. The changes in DOE facilities and operations which we are making to meet these lower risks will require a greater share of our available resources in the coming year. Long-range plans are being prepared now identifying the need ES&H corrective actions, priority, schedule and funding requirements. This planning effort will be completed in FY 1985 to support our future budget requests. With the support of the Congress we will meet our responsibility to support national defense while at the same time protecting environmental quality.

Mr. STRATTON. All right.

[The following questions were submitted to the witness to be answered for the record:]

ENVIRONMENTAL PROTECTION

Mr. STRATTON. What is the total projected expenditure for environmental protection during FY 1986 and can you break it down against specific legislative acts?

Mr. OFTE. The total dollar expenditure is estimated to be approximately $383 million in FY 1986. About 70 percent is for weapons activities while the other 30 percent is for materials production activities. As to identifying these expenditures against specific legislation, we are currently developing a long-range plan for all Defense Programs facilities which will address this concern. However, many projects support several environmental initiatives, and it may not be possible to identify the specific requirements for each task.

Mr. STRATTON. What are the exposure limits discussed in the radioepidemiological tables and how do these limits compare to current standards?

Mr. OFTE. The existing standards for exposures to offsite populations to ionizing radiation is 100 mr per year above background, excluding medical exposures; and to workers 5 rem per year. The compensation tables developed pursuant to Senator Hatch's rider to the Orphan Drug Act recommend compensation schemes for exposure limits of 10 mr and greater. In most areas of the country, naturally occurring background levels of radiation are greater than 60 mr per year. The tables in the legislative report and their applications are subject to great uncertainties. In the Department of Energy comments submitted to the Department of Health and Human Services, we emphasized that the tables should not be used for compensation for exposures to low level radiation. However, the tables do add another guide to the literature regarding radiation compensation and should probably be utilized for high exposures of 10 rem or more.

Mr. STRATTON. What is DOE experience in obtaining permits required by environmental regulations?

Mr. OFTE. DOE has been successful in obtaining regulatory permits from the states and Environmental Protection Agency for pollution control and abatement at our facilities. Often this requires extensive negotiations with regulators as well as formal public interactions. Today, the DOE experience is generally similar to that of private industry. DOE has not historically obtained all permits required or private industry because our sites are federal facilities operated under the Atomic Energy Act. Due to recent changes in environmental legislation and litigation, such as the NRDC and LEAF versus Hodel case involving the Oak Ridge Operations, many more permits are now being required for our operations.

This, coupled with the growth in our production program, has resulted in the dramatic expansion of our activities related to the permitting process.

Mr. STRATTON. What are you planning to do to mitigate the hot water discharges from the Savannah River Plant C and K reactors?

Mr. OFTE. The Savannah River Operations Office has performed a Thermal Mitigation Study to determine the alternatives available for complying with the Federal and South Carolina water quality standards. The study report was provided to the South Carolina Department of Health and Environmental Control in November 1984 for their review. This report is also being reviewed to determine the appropriate level of NEPA documentation required to ascertain the appropriate mitigation systems for the C and K reactors.

It appears that large capital investments, such as cooling towers, would have to be made to comply with the applicable Federal and South Carolina water quality standards. Changes in Federal legislation would be required to allow the most cost-effective thermal mitigation alternatives from an overall environmental protection perspective.

Mr. OFTE. Mr. Chairman, I don't know if it would interest you, but we do have Mr. LaGrone here with us today from Oak Ridge. I thought it might be useful to you to hear him do a recapitulation of his experiences based on coming in as a new Operations office manager at Oak Ridge 2 years ago, and then being hit with the mercury problem and more recently the problem at Fernald and the like, if you would like that.

Mr. STRATTON. Yes, I think we would be glad to have that.

Mr. OFTE. All right sir, I will ask Mr. LaGrone to take my place.

Mr. STRATTON. I know we touched on that last year.

STATEMENT OF JOE LaGRONE, MANAGER, OAK RIDGE OPERATIONS OFFICE

Mr. LAGRONE. Thank you, Mr. Chairman. I am Manager of the Oak Ridge Operations Office, a position I assumed in late April 1983. I will, in the interest of the committee's time, realizing the lateness of the hour, try to summarize as rapidly as possible and would like to focus on two situations, one being the mercury situation, as I refer to it, which really is the tip of the iceberg in terms of the environmental problems that came to light in 1983 at Oak Ridge.

In May of 1983, we announced, after a freedom of information request, that something on the order of 2 million pounds of mercury, which had been used in a lithium process in the 1950's and 1960's could not be accounted for. We knew at least something like 250,000 pounds of that material had gone down a small stream called East Fork Popular Creek and various other thousands of pounds, adding up to a total of like 2 million pounds could not be accounted for.

Studies to date show no adverse impact on the health of individuals living in the area. There are studies ongoing that involve the Department of Energy, and the Tennessee Valley Authority since the waterway is involved into TVA's lakes and areas they are responsible for.

The task force we put together includes USGS, Environmental Protection Agency and environmental groups as well as the city of Oak Ridge. But what the mercury problem did bring to light was a serious credibility problem. This data had been known for some period of time within the Department of Energy and its predecessor, but simply had not been released, for whatever reasons I do not know.

It was apparently not considered that significant. It was never put out. What it led to was identification of some fairly serious problems in terms of other waste, radioactive wastes, uranium chips, beryllium, PCB's, and other products stored in unlined and buried pits since the 1950's, some of which leaked out into creeks and streams, and some of it ultimately reaches Clinch River.

There is one particular site known as White Oak Lake. I believe Mr. Klein is familiar with that particular location. EPA has dubbed it the most polluted body of water in the United States. It contains products such as cesium, strontium 90 and a variety of other things that have leached out of the burial pits.

COST OF CLEANUP AT OAK RIDGE

Hearings were held by Mrs. Lloyd and Mr. Gore at which we testified in July of 1983. In pursuit of their request, we did a study to determine what would it cost to clean up the environmental problems in the Oak Ridge area and on the Oak Ridge reservation. Our best estimate at the time that study was final, I believe in January of 1984, or February, was that it would cost $800 to $900 million for the cleanup.

We realize that money is not going to come overnight but it puts into perspective the magnitude of the problems. Lawsuits were filed, one heard in the Federal District Court, Eastern District of Tennessee, which determined DOE was in fact subject to RCRA. It determined DOE's radioactive waste activities were subject to the Atomic Energy Act. As Mr. Ofte mentioned, the question of mixed waste still remains to be resolved.

At the Y-12 plant alone were more than 200 discharge points. At each of the points, had the court chosen to enforce, we could have been fined $10,000 per day per discharge point. That alone could have gone into, we calculate, several hundreds of millions of dollars.

However, the court did not determine that we should be paying out money nor did it find we should shut down operations. We like to think a big part of the reason the court did not find in those directions was the fact that we had moved actively, positively, quickly, and openly to work with the State, county, and community and regulatory agencies to try to resolve the problems and try to put things on top of the table and say, "Yes, there are problems, and we are working to clean these up."

The other thing we are doing with the State of Tennessee is, as they find noncompliance areas, they issue notifications. If we don't issue a specific schedule for compliance, we face shutdown. So far we have been able to negotiate agreed orders and come into compliance or acceptable schedules for compliance.

The situation at Oak Ridge is going to take a number of years to be rectified in my judgment, but I think we are on the right path, and I think we are using the right methodologies and technologies. We have had the support we have needed from the Congress to get the funding. We have had the support from the Department of Energy in Washington to help us get what we need to do.

As I say, the dollars being spent now already are up in the millions of dollars. There is more detail on this that I know has already been submitted to the committee.

If I could turn to the two viewgraphs, I would like to talk briefly to what I call a more recent situation, Fernald.

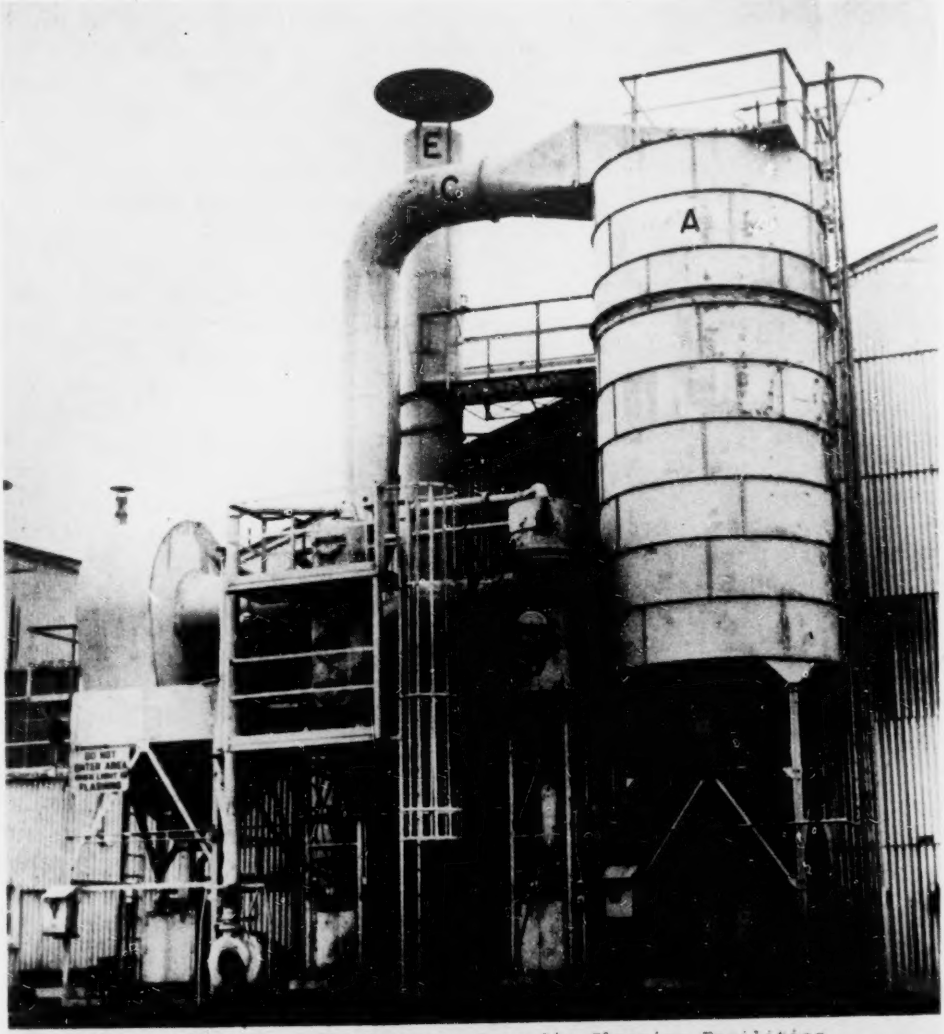

E
C
A
DO NOT
ENTER AREA
WHEN LIGHT
FLASHING

Photo 1 The Plant 9 Remelt Furnaces Area Air Cleaning Facilities

A. American Air Filter Baghouse
B. Hoffman High Vacuum Cyclone
C. Inlet Duct
D. Outlet Duct
E. Emission Stack

FERNALD PLANT

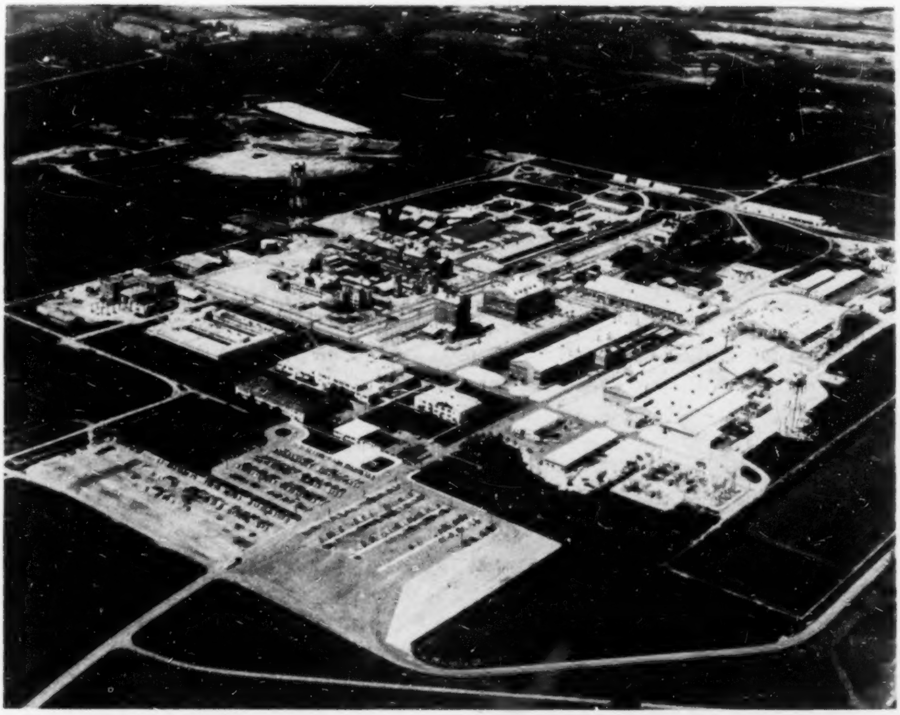
What you see here is a bag house. In the largest cylinder are about 40 bags approximately 22 feet and a few inches in length, and about 13 inches in diameter. That particular technology goes back to the 1960's. That particular plant, plant nine within the overall Fernald plant, sees the most uranium oxide releases and activity of anywhere within the plant.

The plant was taken down for operations and maintenance and cleanout and so forth over the Labor Day weekend, in September 1984. And as best we can now determine, between the period sometime roughly mid-September until about the 7th of December, when the Department of Energy was notified by the contractor, something on the order of 123 kilograms of material, roughly 200-plus pounds of material, escaped to the atmosphere.

The plant was cleaned out, revacuumed, reconnected, and restarted. On the 14th of December, after a couple of shift operations a slight detection in leakage was shown again. Upon learning of that, I ordered and directed the plant closed until we could determine exactly what was happening and got some experts on bag houses from the outside, one from Argonne and two from the Y-12 plant to find out what was the problem and what are the fixes that need to be made.

The fixes have been made. I am awaiting a letter now from the experts certifying that the fixes have been made and that the plant is ready to run a uranium test. I am hopeful that can take place within the next week. We are getting near the point where it will have impact on the reactor.

Again, to use a trite phrase, it is the tip of the iceberg, because we are looking into a 200-plus pound release.



Since inception I have discovered that is something on the order of about 95,000 kilograms of material have escaped out the stacks at the various points within the plant in its 30-year history. That is uranium oxide. Roughly 74,000 kilograms of material have escaped via the waterway and pathways out to creeks, and so forth.

If I might talk about that just for a moment, there is a small stream that runs here which connects up later with the Great Miami River. That is where a lot, and most of the material we think, has gone over the years.

In this particular area, including this pit, there are four old pits that are buried. We estimate something on the order of 5 million kilograms of material, again uranium oxides plus other chemical wastes and hazards, buried there. Not shown on this particular picture, but over in this area, beyond this tank, are two tanks that are much like a city water tank which have earth bermed up around them, that contain about 2 kilograms of radium from the African metals days, materials prepared by the Belgians that we processed. They at some point thought they would want to take title back because of its value; however, the United States ended up taking title to that after a 25-year contract, so that material is on site there as well.

What has happened, and we have known since 1981, some wells offsite in this area are showing increased levels of uranium contamination. There are three wells in particular. The State of Ohio was notified. Well owners were notified. But in some cases, at least in one, a tenant of a particular place we feel was not notified that in fact there was some contamination.

The real problem gets back to one of credibility. Why didn't this information come out 25 years ago, 5 years ago or 2 years ago? Again, I don't know the answer to that question. Instead of trying to look back and fix blame, what we are trying to do is fix the problem we have here with the plant 9 and plant 5, which operate in this area.

One of the things we did do, we have authority to extend this contract for another 5 years on noncompetitive basis, with National Lead, who has been the operator of the plant since inception. They have done an excellent job in terms of producing product, and they have met the schedules.

However, it was my judgment that I had better investigate since we had a situation there where we had, in the face of DOE orders, not been notified for a period of 3 months of this kind of release. I had a special study done back last year trying to create a baseline of what is the situation at Fernald, because we have been trying to go through plant by plant looking at what are our problems.

We finally got a chance to turn some attention up to Ohio. In the face of that particular study, but most especially the mere fact that for 3 months material was being released and responsible people in the organization did not take action to shut the plant down and find out what was going on, I felt we had a credibility problem of the magnitude we should at least, instead of extending that contract, go and compete that contract.

So we are in the process of competing that contract. The request for proposals will be on the street by about the middle of April. We expect to have a new contractor on board by April 1, 1986. That is where it stands today.

We have done an investigation of this particular incident. Copies of reports were delivered to this committee and members last week. That concludes the material that I would like to present. If there are questions or comments, we would be pleased to respond.

Mr. **Stratton**. Dr. Mansfield, do you have a question?

Dr. **Mansfield**. One short one.

Are you going to have a program then to list and publicize the history of all releases from all facilities ahead of time so they won't be dragged out in a spectacular way if there is an accident?

Mr. **LaGrone**. That is what we are trying to do. Obviously, at Fernald, money will have to be spent to characterize what is in the pits, how much of the material will get to aquifers because it is only 20, 25 miles from Cincinnati.

But we have always been going through the uranium enrichment plants to find the same things, find what is lying there. We are finding some problems. I will make no bones about it. It is too bad we didn't find the problems at Fernald sooner or didn't do some of the things; for example, there has been on DOE on-sight presence at Fernald since about 1973. One of the things that I had decided after we had our special study done last year was to put some on-site presence there.

We started recruitment in October, named our new site manager February 3rd. I will have with him a construction engineer. If we find we need more people, we will put them up there.

Mr. **Stratton**. Any other questions?

Mr. **LaGrone**. Thank you, Mr. Chairman.

Mr. STRATTON. Thank you very much. We appreciate that. That brings our hearings to a close, I believe. We appreciate your patience.

We will convene, adjourn now until Monday at 2 o'clock.

[Whereupon, at 1:02, the subcommittee was adjourned until 2 p.m., Monday, February 25, 1985.]

INDEX

CHRONOLOGICAL LIST OF HEARINGS

Page
Wednesday, February 20 1
Thursday, February 21 75
Friday, February 22 301

PRINCIPAL WITNESSES WHO APPEARED IN PERSON OR SUBMITTED WRITTEN STATEMENTS

Bacon, Commodore Roger F., USN: Statement 68
  DOE programs for the Navy 68
  Tomahawk missile 68
  Trident I missile 69
Batzel, Roger E., director, Lawrence Livermore National Laboratory:
  Statement 109
    Blue Ribbon Task Force study 110
    Buffer land acquisition 118
    Energy weapon concepts, nuclear directed 111
    Inertial confinement fusion 112
    Isotope, special separation 116
    MX and small ICBM, warheads for 110
    Warheads for MX and small ICBM 110
Cochran, Ronald W., Deputy Assistant Secretary for Nuclear Materials, Department of Energy:
  Statement 222
    Budget activities 249
    Nuclear:
      Fuel cycle 225
      Material sites 226
      Material supply/demand 226
      Materials production 223, 232, 243
        Changes 233
        Highlights, fiscal year 1986 budget 232
        Policy Act 246
        Request 235
    Production:
      Annual summary 228
      U.S. and U.S.S.R. comparison 228
    Program activities 236
    Reactor production, Savannah River 240
    Tritium supply, importance of 230
    Uranium requirements 228
    Waste:
      Budget activities 248
      By-product management 250
      Calcining process 254
      Isolation pilot plant 259
      Low level 247
      Management 245
      Nuclear Policy Act 246
      Processing facility 251
      Radioactive, source and management 246
      Repository, high-level 245, 247, 253

Page

- Cochran, Ronald W., Deputy Assistant Secretary for Nuclear Materials, Department of Energy—Continued
  - Statement—Continued
    - Waste—Continued
      - Storage 249
      - Transportation 248
      - Transuranic 247, 255, 264
  - Prepared statement 264
    - Defense programs:
      - Budget request 271, 274
        - Changes from fiscal year 1985 272
        - Highlights 272
        - Summary, fiscal year 1986 273
      - Introduction 265
      - Nuclear materials 265
      - Production:
        - Rates 266
        - Sites 270
      - Requirements 266
      - Uranium 267
    - Planned activities 279
    - Production initiatives 276
    - Reactor support 278
    - Waste, defense programs:
      - Byproducts, management of 285, 294, 297
      - High-level transuranic storage sites 281
      - Inventory 281
      - Investment strategy 282
      - Landlord responsibilities 288
      - Permanent disposal, milestones for 283
      - Radioactive types 280
      - Transportation operations 290, 295
- Cook, Billy G., Deputy Assistant for Security Affairs, Department of Energy:
  - Statement 301
    - Arms control 355
    - Armament protective force 321
    - Classification office 352
    - Command, control and communication 347
    - Computer security 349
    - Defense programs, security affairs 302
    - Focal point 317
    - Lessons learned, major 314
    - Management and evaluation process 315
    - Material:
      - Control 326
        - Accountability 327
      - Handling, nuclear 327
    - Nuclear material, handling 327
    - Operations offices, key facilities 303
    - Sensor system, exterior 320, 334
    - Terrorism, international 310
    - Training:
      - Academy 323, 372
      - Auxiliary guard 325
      - SWAT 324
  - Prepared statement 358
    - Air space requirements 371
    - Arms control 368
    - Budget 359, 361, 366
    - Construction 364, 370
    - Energy, directed, verification 367, 369
    - Initiatives 360, 365
    - Monitoring, onsite 368
    - Program direction 370
    - Security, nuclear safeguards 359, 361, 363, 364, 365
    - Seismic 367
    - Spaceborne sensors 366

Page

- Cook, Billy G., Deputy Assistant for Security Affairs, Department of Energy—Continued
  - Prepared statement—Continued
    - Technology:
      - Developments 362
      - Verification and control 365, 366, 369
    - Verification, directed energy 367, 369
- Dacey, George C., president, Sandia National Laboratories: Statement 196
  - America's brightest young scientists 200
  - National laboratories 196
    - Record of 197
    - Threats to excellence 196
  - Nuclear:
    - Stockpile reliability 197
    - Weapon production costs 198
    - Weapon production record 197
  - Repeater 199
  - Scientists, America's brightest young 200
- Davidson, Maj. Gen. Alexander K., Deputy Director of Plans, Headquarters, USAF:
  - Statement 64
    - DOE programs for the Air Force 64
    - ICBM guidance system 66
    - Nuclear weapons:
      - Modernization program 65
      - Requirements 64
  - Prepared statement 66
    - Nuclear weapons:
      - Modernization program 67
      - Requirements 66
    - Programs for the Air Force 67
- Davis, Brig. Gen. Sidney, Director, Nuclear and Chemical Directorate, ADC-SOPS, Headquarters, Department of the Army:
  - Statement 61
  - Prepared statement 63
- Dean, Dr. Stephen O., president, Fusion Power Associates: Prepared statement 125
- Derrick, Hon. Butler, a Representative from South Carolina:
  - Statement 132
  - Prepared statement 189
- Glass, Alexander J., president, KMS Fusion, Inc.: Prepared statement 126
  - ICF program:
    - Budget request 129
    - Contributions 128
    - Role, unique 127
  - Inertial confinement fusion research 126
    - Program 127
  - Nova project 127
- Holt, Hon. Marjorie S., a Representative from Maryland, ranking minority member, Procurement and Military Nuclear Systems Subcommittee 5
- Hoover, Hon. William W., Assistant Secretary for Defense Programs, Department of Energy:
  - Statement 6
    - Community involvement 16
    - Defense:
      - Initiative program 30
      - Programs:
        - Complex 8
        - Mission 7
        - Organizational changes 7
    - Environmental:
      - Activities 11
      - Problems 14
    - Funding:
      - Highlights 22
      - Summary of 21
    - Interagency relationships 17
    - Melvin Price, tribute to 6

Page

- Hoover, Hon. William W., Assistant Secretary for Defense Programs, Department of Energy—Continued
  - Statement—Continued
    - Safety 10
    - Security and safeguards 10
    - Tribute to Melvin Price 6
  - Prepared statement 23
    - Budget:
      - Growth 28
      - Summary highlights 29
    - Environmental concern 26
    - Good neighbor policy 26
    - Investment strategy 27
    - National defense, DOE role in 27
    - Nuclear materials safeguards and security 26
    - Personal policy 25
    - Restoration, revitalization, productivity 27
    - Safety 25
    - Security and nuclear materials safeguards 26
- Kerr, Donald M., Jr., director, Los Alamos National Laboratory: Statement 206
  - Arms control and verification 210
  - Computers, value of 208
  - Funding 212
  - Isotope separation, special 211
  - Modernization, strategic tactical 208
  - New construction, postponement of 217
  - Safeguards, security 213, 216
  - Serious problems 217
  - Strategic defense 209
- LaGrone, Joe, manager, Oak Ridge Operations Office: Statement 390
  - Cleanup at Oak Ridge, cost of 390
  - Fernald plant 393
- McCrory, Robert L., director, Laboratory for Laser Energetics, University of Rochester, Rochester, NY: Statement 130
  - Education 130
  - Introduction 130
  - Laser Fusion Program 131
  - Laser Users Facility, operation of national 132
  - Program funding and management 135
- Ofte, Don, Deputy Assistant Secretary for Defense Programs, Department of Energy:
  - Statement 373
    - Defense programs—weapons activities 374
    - Environmental:
      - EPA standards 377
      - Legislation:
        - Cost of 380
        - History of 377
      - Safety and health activities 381
    - Media coverage 374
    - Millirem standard, application of 100 379
    - Radiological protection record, DOE 375
    - Waste, Defense processing facility 383
    - Weapons activities, Defense programs 374
  - Prepared statement 384
    - History 384
    - Implementation, DOE 385
    - Legal impacts 387
    - Legislation 384
    - National security impact 388
    - Programmatic impact 385
      - By legislation 386
    - Requirements, paperwork and reporting 387
    - Uncertainties, future 388
- Stratton, Hon. Samuel S., a Representative from New York, chairman, Procurement and Military Nuclear Systems Subcommittee 1

Page

Wagner, Richard L., Jr., Chairman, Military Liaison Committee to the Department of Energy and Assistant to the Secretary of Defense for Atomic Energy:
  Statement 31
    Arms control agreement 36
    General talking points 31
    Military Liaison Committee members 31
    MX commitment to 37
    Nonnuclear:
      Research and developement at laboratories 51
      SDI concepts 45
    Nuclear:
      Procurement 68
      SDI option 42
    Research and development:
      Long-term effort 41
      Testing activity, support for 47
    Soviets:
      RDT&E programs 50
      Strengths 32
    Stockpile inventory 34
    Strategic Defense Initiative 40
    Tritium and plutonium production 50
  Prepared statement 53
    Production stockpile 59
Withers, Maj. Gen. George K., Deputy Assistant Secretary for Military Application, Department of Energy:
  Statement 75
    Budget request:
      Highlights 98
      Inertial fusion:
        Program 92
        Study 95
      Production and surveillance 84
      Program direction 97
      Restoration and revitalization 85
      Safeguards and security 95
      Weapons 82
    Cost management, improved 79
    Nuclear weapons complex 77
    Research and development 77
      Soviet capabilities 78
    Special topics 80
    Working relationships 75
  Prepared statement 98
    Accomplishments 99
    Blue ribbon task group 105
    Budget request 101
    Overview 98
    Soviet military capability 99
    Strategy, investment 99
    Technology, changing 99
    Weapons complex facilities 98

○